

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



Reserve

STATE ACCOMPLISHMENTS AND PLANS

FROM

"A NATIONAL PLAN FOR AMERICAN FORESTRY"

A Report Prepared by the Forest Service, U. S. Department of Agriculture
in Response to S. Res. 175 (72d Congress)

SENATE DOCUMENT NO. 12 — SEPARATE NO. 9



STATE ACCOMPLISHMENTS AND PLANS .

FROM

“A NATIONAL PLAN FOR AMERICAN FORESTRY”

A Report Prepared by the Forest Service, U. S. Department of Agriculture
in Response to S. Res. 175 (72d Congress)

SENATE DOCUMENT No. 12 – SEPARATE No. 9

1
F76 Naa
OCT 12 1936



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1933

COPIES OF SENATE DOCUMENT 12, A NATIONAL PLAN FOR
AMERICAN FORESTRY, FROM WHICH THIS SEPARATE HAS BEEN
REPRINTED, ARE ON SALE BY THE SUPERINTENDENT OF DOCU-
MENTS WASHINGTON, D.C. PRICE \$1.75. REMITTANCE
SHOULD BE MADE BY MONEY ORDER.

STATE ACCOMPLISHMENTS AND PLANS

By HERBERT A. SMITH, Assistant Forester, C. R. TILLOTSON, District Forest Inspector, and Catherine M. O'DONNELL, Law Compiler

CONTENTS

	Page
The diversity of State policies of forestry	733
Diversities within regions	734
Diversities between regions	737
The origin and development of State policies of forestry	742
How State forestry started	742
Why the early movement accomplished little	745
Early Federal forestry movement	746
The first stages of forestry administration by the States	749
The New York problem of objectives	756
New York's decision for the Adirondacks	759
Further development of forest administration in New York, to 1915 ..	760
The origin of the "conservation department" idea	762
The development of State forests in Pennsylvania	763
The first steps in organized fire protection	764
Summary of progress in State forestry activities down to the passage of the Weeks law	766
The effect of the Weeks law on State forestry	776
The present status of State forestry activities	778
State organizations	778
The promotion of private forestry	783
State forest land administration	823

THE DIVERSITY OF STATE POLICIES OF FORESTRY

The forest policies of the several States are conspicuously diverse. They differ not only (as would naturally be expected) regionally, in consequence of having to face unlike problems, or because of differences in wealth and resulting capacity to undertake public enterprises for the general welfare, or on account of different traditions and conceptions regarding the proper field of government; they differ also in States of substantially identical problems, comparable capacity to meet them, and generally similar traditions and practices in the matter of government. Yet State forestry has not been evolved by each State independently. The development of these varied policies and programs has taken place in integral connection with the general forestry movement, which has been national in character.

The clue to many of the dissimilarities in the approach of different States to essentially similar problems, and in the degree of progress made, can be found only by tracing out the history of the forestry movement in each State. Much has been due to accident, and much to the personality and aggressiveness of individual leaders or opponents. The state of public sentiment and the attitude of the press have of course been important. The essential point to bear in mind is that, if the future is to be judged by the past, uniformity of action should not be looked for, even where substantially identical situations have to be dealt with.

Unquestionably, however, the present diversity of State forest policies would be enormously greater had it not been for the effect upon the States of Federal activities and policies. Indirectly, Federal forestry has had a pronounced influence by force of example and suggestion. Directly, it has done much both to stimulate action and to determine the line of action, through cooperative and other aid.

DIVERSITIES WITHIN REGIONS

The individuality of State forest policies comes out when States in the same general region are compared with one another. Some of the more striking contrasts which are revealed in the northeastern States will serve for illustration.

The three northern New England States are predominantly rural and have a high percentage of their area in forest. In Maine, forests occupy 76 percent of the land area; in New Hampshire, 77 percent; and in Vermont, 55 percent. State forestry in Maine is almost entirely limited to protection. Most of the forest area of Maine is in the so-called unorganized towns—that is, the wilderness part of the State. From 70 to 75 percent of the total cost of maintaining the fire-protective system is provided by a special tax levied on property most of which lies in these unorganized towns; virtually, therefore, Maine goes on the principle that the property protected should bear most of the burden. The State does not do much to aid private forestry through investigation and advice except that it is outstanding in its investigations of forest insects and advice for their control. Its forestry activities head up in a commissioner of forestry, who is also in charge of the handling of all the State's lands. The commissioner is appointed directly by the governor, for a 4-year term, and need not be a technically trained forester. Nor, in point of fact, is there any strong reason why he should be, with the field of activity what it is in Maine. It is nevertheless noticeable that of his year-long force 13 are technical men and only 4 nontechnical. The total 1931-32 appropriation of the department for all purposes is at the rate of 1.34 cents per acre for all the forest land (other than Federal) in the State, and more than 91 percent of the total is for protection against fire, disease, and insects.

In New Hampshire and Vermont, while the law in neither case requires that the head of the forestry department shall be a trained forester, the positions are filled by trained foresters, and it is pretty safe to say that they always will be, for the scope of the job recognizedly calls for a technical forester. In Vermont the commissioner of forestry is appointed for a 2-year period by the governor, with the advice and consent of the senate. In New Hampshire the State forester is responsible to a commission consisting of three members, appointed by the governor, with the advice of the council, for overlapping 3-year terms. New Hampshire has nearly 33,000 acres in State forests under administration, and Vermont nearly 41,000 acres. In New Hampshire the acquisition of further land for State forests is at present in abeyance, and there is no definite program for building up a larger State forest system. In Vermont the continuation of purchases is intended, subject of course to the condition of the State's finances, up to 100,000 acres. In both New Hampshire and Vermont the maintenance of the fire-protective system is regarded primarily

as a public function. The New Hampshire laws, however, provide for patrol by private owners of 1,000 acres or more of forest land in any one town or unorganized place, and the Vermont laws provide for assessing a part of heavy suppression costs against owners of unoccupied or unenclosed lands unless these lands had been given protection by their owners. Out of a 1931-32 annual forestry appropriation of \$77,250, New Hampshire made available for fire protection 36 percent, equivalent to a per acre protection expenditure of 0.65 cent, not including a Federal allotment of \$18,012. Vermont's funds for fire protection are 29 percent of its total appropriation of \$54,117, equivalent to 0.46 cent per acre of forest land protected. Including funds for protection against insects and tree diseases, 58 percent of the New Hampshire total appropriation was for protection, as against 33 percent in Vermont. The functions of the State foresters in both New Hampshire and Vermont embrace research, extension, and general education. By "extension" is meant services of practical assistance and advice to private forest owners to extend the practice of forestry.

In contrast with northern New England, southern New England is highly industrialized and much more densely populated. But while there are no extensive areas of wild lands in large ownerships, as is the case in Maine and to a less degree in New Hampshire, there are portions of all three States in which there is relatively little industrialization and in which, also, the major part of the land is unsuitable for agriculture and is in forest. The most extensive area of this kind is in western Massachusetts, which is broadly comparable to the Vermont Green Mountain country northward of it. The land-purchase program of the Massachusetts Forestry Department has been largely concentrated in this section of the State. Of the total area of Massachusetts, forest lands make up 63 percent; of Connecticut, 51 percent; and of Rhode Island, 41 percent. Were the western part of Massachusetts to be considered separately, it would show a percentage of forest land to all land more nearly approaching that of New Hampshire. While somewhat different forest policies might be expected in southern New England from those in northern New England because of differences in their forest conditions, the major consideration is the greater wealth of these States and their ability, consequently, to engage in public undertakings of a larger scope, if they are held to be important for the State's welfare.

Certainly Massachusetts presents a strong contrast to New Hampshire and Vermont. With a forest area about equal to that of Vermont and about 25 percent less than that of New Hampshire, Massachusetts appropriates for its forestry work more than five times as much as New Hampshire and nearly eight times as much as Vermont. More than one half this total is for the maintenance and improvement of the system of State forests, which at present have a total area of 120,000 acres, with the prospect of an increase under the present policy of the State to 150,000 acres. The present State forests form 3.7 percent of the total forest area, and the contemplated eventual 150,000 acres will form 4.6 percent. Connecticut, however, with 3.9 percent of the total forest area now in State forests, contemplates their increase to 15.8 percent. On the other hand, Rhode Island has made the merest beginning toward a State forest system, if it can be called a beginning, with 410 acres now so classed, and no

definite program of further acquisition. Rhode Island's total expenditures on her forestry work from State appropriations is equivalent to 8.7 cents per acre of forested land; Connecticut's, 11.6 cents; Massachusetts', 13.1 cents. While Rhode Island has had a commissioner of forestry or similar officer since 1907, the position has never been filled by a technically trained forester. With substantially the same basic reasons for a policy of forestry as exists in Connecticut, the interest in Rhode Island has been slight relatively, and progress until recently exceedingly lagging.

The commissioner of conservation in Massachusetts is ex-officio State forester. He is appointed by the Governor, with the consent of the council, for a 3-year period. He appoints his subordinates from a civil-service register. Fire suppression is a function of town wardens, who are nominated by the selectmen of each town and, if satisfactory, are appointed by the State forester. The towns shoulder the entire cost of forest-fire suppression.

In Connecticut the State forester is chosen by a commission of seven members, six of whom are appointed by the Governor, with the forester of the Connecticut Agricultural Experiment Station serving ex officio. The State forester hires such assistants as the commission judges necessary. He chooses his own fire wardens without reference to the towns, pays all initial costs of fire suppression, and charges half of it back to the counties in which the fires occurred.

Space forbids going into any such detail regarding the dissimilarity of forest policies outside of New England, when States in the same general region and with the same general problems are compared. All that need be done is to point out swiftly a few striking examples.

For the first example, a comparison of New York, Pennsylvania, and New Jersey may be made. In both New York and Pennsylvania the acquisition and administration of forest lands has been the leading State activity and the most outstanding part of the forest policy from the time that these States began to have a forest policy—and in both cases that goes back into the nineteenth century. New Jersey, on the other hand, has had no acquisition policy at all comparable in scope or purpose until within relatively recent years. The acquisition policy of New York, however, has had chiefly in view the protection of the scenic, recreational, and water resources embraced in the Adirondack and Catskill Mountain regions; and to safeguard fully the forests of the State-owned land in these regions, New York has considered it wise to write into its constitution a provision specifying that no timber on the State lands within the Adirondack and Catskill Parks may be sold, removed, or destroyed. Pennsylvania embarked on its acquisition policy to bring back to productiveness at least a part of the great area formerly covered with fine forests which had become worthless through forest devastation, and aims to grow commercial timber on these lands, now amounting to about 1,600,000 acres. New York is unique, also, among all the States in the fact that she has lately adopted a policy of acquisition to take over and reforest abandoned and submarginal farm lands, at a total cost of \$20,000,000.

Again, we may compare Maryland, Virginia, and West Virginia. Maryland and Virginia have both for a long term of years maintained State forestry departments headed by technical foresters, with fire protection as their primary duty but with extension and general informational and educational activities also included. In addition,

Maryland entered on a policy of acquisition in 1906 and now has in State forests under administration approximately 50,000 acres, as against 588 acres in Virginia. Maryland, with a total forest area of 2,200,000 acres, appropriates annually for its forestry work more than \$90,000; Virginia, with 15 million acres, a little more than \$39,000. West Virginia, with 10 million acres of forest land, places its forestry work in a department presided over by the State fish, game, and forestry commission, and finances it by making available 25 percent of the receipts from fish and game licenses. Public sentiment throughout the State regarding a program of forestry beyond fire protection appears to be rather apathetic, and not particularly aggressive even in the matter of protection outside of a limited group of large landowners. Until 1929 the State did not have its forestry work handled by a technical forester, except that an extension forester was and still is provided by the extension service of the State Agricultural College. While 15,393 acres are classed as embraced in State forests, the land was acquired primarily for game protection, a few years ago, and there is no program contemplating further acquisition. In comparison with either Maryland or Virginia, West Virginia has not paid much attention to forestry.

DIVERSITIES BETWEEN REGIONS

There are broad distinctions of forest policy that mark off from one another groups of States having unlike conditions, natural or economic. They will come out in detail as the accomplishments and present status of State forestry are outlined. The character of the differences may be illustrated here by comparing briefly the situations in the Northeast, the Lake States, the South, and the West.

In the Northeast, State forestry has long been firmly established. Public opinion in its favor was created by the rapid cutting off of the original forests as the nineteenth century advanced; the accompanying and following devastation wrought by uncontrolled fires; the increasing dependence of the region upon the Lake States and the South for lumber and other forest products; the wood requirements of the many and growing industries, and of an increasing industrial population; and the scenic and recreational values in the Adirondack, Catskill, White Mountain and other regions. This favorable sentiment was strengthened by the unquestioned belief that deforestation would have revolutionary effects upon the climate of the region as well as upon streamflow and water supplies generally, that navigation and power were already affected, and that the actual wiping out of the forests was under way. Scientific thought played a large part in arousing and shaping public opinion; scientists were conspicuous leaders in the early forestry movement, especially in the Northeast. While considerations of sentiment were undeniably also an influence, economic reasons furnished the chief impulse for public forestry.

Timber was plainly the only feasible crop for much of the land. The acreage under cultivation was shrinking, the forest area gaining. The richer States were financially able to undertake enterprises of public forest ownership without difficulty. Even the safeguarding of mountain scenery against the unsightly results of destructive lumbering and fires had a strong economic motive. In New York the perpetuation of the Adirondack forest was considered essential for the water of the Erie Canal, and important for the navigation of

the Hudson. In New England many manufacturing enterprises were dependent for power on the rivers fed from the White Mountain region. Pennsylvania was deeply concerned over the fast increasing amount of denuded land which was gaining for itself the name of "the Pennsylvania desert."

So forestry in the Northeast got off to an early start. In New York and Pennsylvania, policies of State forest ownership came to the fore at once. As technical foresters became available and the forestry movement grew stronger throughout the country, most of the other States created forestry departments, which at first were set up principally to inform and advise forest owners on forestry practices and to gather information on the forest resources and forest needs of their several States, but which soon began to take on administrative duties of fire control, followed more or less shortly in a majority of cases by the first steps toward building up State forests. While some of the Northeastern States have relatively little to show in forestry, the region as a whole is outstanding in the strength of its organizations, the financial support given them, and the scope of their programs. In recent years, provision for the outdoor recreational needs of a highly industrialized and populous section of the country has come to occupy a larger place in the plans and activities of the forestry departments than was contemplated at first.

In short, the early exploitation of the virgin stands, the large amounts of second growth, the extent of the forest lands unusable for other purposes than timber growing, the importance of local timber supplies to meet expanding industrial and construction requirements, the recreational needs of a large and growing urban population, the importance of water, the length of time during which public forestry has been under way, and the wealth of most of the States, making relatively liberal public expenditures for forest purposes easy, explain why in the northeast forestry stands high and policies of State forest ownership and administration are further developed than in any other region, with a total of nearly 4,500,000 acres in State forests and parks.

In the Lake States, also, forestry got off to an early start, but with less success. The terrific forest fires of 1894 were followed the next year in both Minnesota and Wisconsin by provision for a chief fire warden, and in 1899 Minnesota set up a State board of forestry and Michigan a forestry commission. Unlike the Northeastern States, however, the Lake States at the turn of the century were still in the hey-day of lumber production from the enormous virgin stands of the region. While there was a considerable body of public sentiment in favor of forestry, the era of timber exploitation and land development gave rise to powerful antagonistic forces. Minnesota enacted legislation in 1903 authorizing the forestry board to purchase lands for forest reserves; but virtually nothing was done. Local sentiment in the heavily forested counties preponderantly and strongly favored cutting the timber off, in expectation that the stump lands would be converted into farms and for the sake of the immediate returns from lumbering. In Wisconsin, for a few years, a substantial and very promising program of State forest acquisition and administration was entered upon, only to be suspended. In all three States until within the last decade, the building up and maintenance of systems of protection against forest fires has been the principal concern and accom-

plishment of the forestry departments. Periodically recurring seasons of exceptionally severe fire hazard and losses drove home the necessity for protection and strengthened the public demand for it. Protection was no less in the interest of the lumber industry and timberland owners, so long as their manufacturing equipment and stands of virgin timber remained exposed to destruction by fire, than it was in the interest of future forests.

As the Lake region has been brought face to face with the stern economic realities of the outcome of timber exploitation in sections where extensive agricultural development is impossible, there has been a great awakening. It has been realized that private ownership of heavily timbered lands induced by the profitableness of cutting the timber off must be only temporary if the stripped forest land cannot be put to use. High-pressure efforts to sell stump land to would-be farmers have demonstrated the unfavorable economic and social results of trying to build up agriculture where it cannot in the long run afford the farmer and his family a livelihood. Many millions of acres of cut-over land no longer worth paying taxes on are returning to public ownership in the Lake region through tax forfeiture. Thus a gigantic problem of land utilization is the outstanding feature of the present regional situation.

All three States are now grappling with it and have inaugurated far-reaching policies of retention, acquisition, reforestation, and permanent public administration of nonagricultural lands. Next to the northeastern region, this is the region in which State administration of forests has made greatest progress. The area embraced in State forests (or in Wisconsin, for special reasons which will be brought out later, partly in State and partly in county forests) in the three Lake States is over 1,900,000 acres, but the development of their administration is as yet, for the most part, far behind that in the northeastern group of States and for much of the land is embryonic. The Lake States are financially handicapped, in comparison with the Northeastern States which have assumed large responsibilities of forest land administration, by their much smaller tax base. For example, the total assessed property values per square mile in the three Lake States are only about one fourth those in New York and Pennsylvania, or on the basis of forest area alone—that is, if the total assessed values be divided by the number of square miles of forest—only about one fifth.

In the South most of the growth of State activities in forestry has taken place during the last 10 years. In 1920 only Virginia, North Carolina, Louisiana, and Texas had forestry departments. Tennessee was added in 1921, and Alabama in 1923. There is now a forestry department in every Southern State but one (Arkansas). The main objective in all cases is the control of forest fires. There has not as yet been developed in any of these States a policy looking to the creation of a system of State forests, and almost no State-owned lands are under forestry administration. While nearly every State now has a technically trained State forester, and while the duties of the position include the promotion of forestry through advice to private landowners and through general informational and educational activities, there is little time or money available for other purposes than maintaining the protective organization and arousing public sentiment against fires.

This is not to be wondered at. While exploitation of the virgin timber stands of the South is now far advanced, the region did not become the major lumber producing region of the country until shortly before 1900. Prior to 1890 the cut was too small to make a material inroad on the standing timber. The harvesting of this tremendous accumulation of potential wealth has been a main contribution to the economic development of the South since that time. As in other regions, timber exploitation had to run most of its course before the public became concerned over the fact that exploitation could not go on forever and that where the merchantable stand had disappeared and the great mills shut down for lack of logs, the communities built up around them would melt away. There was no fire menace of the kind that existed in the Lake States, and surface fires to clean off the dead grass and forest litter and keep the forest open were regarded as beneficial rather than harmful. The South had neither the taxable property values nor the viewpoint with respect to the functions and possibilities of the State government as an agency for furthering the general welfare along new lines to be readily inclined to set up forestry departments. All the habits and traditions of a predominantly agricultural, rural, individualistic, and in some respects still almost pioneer stage of economic and political development tended in the direction of a "hands-off" attitude and a lack of any great concern about conserving the sources of future wealth through public action.

The offer of Federal cooperative funds to aid in fire protection has proved a strong influence toward the inauguration of forestry work by a majority of the Southern States since the enactment of the Clarke-McNary law in 1924. The tasks requiring first attention were to build up a protective organization and also a better informed public sentiment on the value of the forest resource, the importance of taking care of it, and the harmful consequences of fire in the woods. Thus the educational—it might almost be termed the missionary—function of the new State departments has loomed large, much as it did a quarter of a century earlier in the North. It has been necessary to convert the rural mind to a changed conception of what is good for the forest, the forest owner, and the community. In default of liberal State appropriations to maintain extensive systems of protection the State foresters have had to depend in major part upon the willingness of private landowners to contribute funds that in turn would bring Federal cooperative contributions. Thus the field, organization, and objectives of the forestry work in the Southern States are in many ways differentiated from those which are characteristic of the work either in the Northeast or in the Lake States. The South, however, faces the approach of a situation essentially like that in the Lake States, through the abandonment of very large amounts of cut-over land which the private owner does not consider worth paying taxes on.

In the West, the development of State forestry has been very greatly affected by the presence of the national forests, which embrace more than one half of the commercial forest land of the region (though by no means a corresponding amount of the merchantable timber, since the private holdings as a rule have the better and more accessible

stands). Naturally, Federal administration of so large a part of the western forest land makes State policies of forest ownership and administration much less urgent than they would otherwise be. The principal objective of the early State forestry movements in Colorado and California was to provide an agency for safeguarding the interests of these States in the preservation of the public domain forests; and after the Federal Government entered upon the task those who had led in the State movements were more than satisfied to have the State interests so taken care of. At the same time, national forest administration has been a positive influence for the development of State forestry policies, as well as a means of meeting many of the needs which in the rest of the country have placed heavy responsibilities upon the States.

Outside of Colorado and California, the inception of State forestry activities in the West was an outgrowth of the need of timberland owners to obtain organized protection against forest fires in regions of high exposure and great investments in stumpage. First the timberland owners organized protective associations as a private activity, on a voluntary membership basis; then, to make their protection more effective, they sought the aid and authority of the States to extend the system to intermingled and adjacent lands, State and private, which needed to be covered along with the association lands. Under the resulting set-up most of the cost of protecting the private timber holdings is met by the owners, with the assistance of Federal cooperative funds; and the protective organizations are built up and run mainly by the associations. They work in close touch with the national forest protective organizations and have taken over from the latter the methods developed by the Federal Forest Service applicable to their own undertaking. This general scheme of organization particularly characterizes the Northwestern and Pacific Coast States. In certain of the other Western States, the Federal protective system is directly utilized by the States under cooperative agreements with the Forest Service to cover State and private lands along with national forest lands, as a single undertaking.

There is also in the West an important development of State forest land administration, due largely to the example of the national forests combined with the fact that a few States still have in their possession large acreages of forest lands received through Federal land grants. Most of the granted lands were originally scattered, but by exchanges of their school lands within the national forests for solid blocks of timberlands made available for their selection under exchange agreements, Montana, Idaho, and Washington have obtained nearly 800,000 acres suitable for permanent administration as State forests and likely to be so administered. This situation will be further explained and discussed later; the point to be noted here is that, in the West hitherto, granted lands in the possession of the States have been the chief cause of the beginning of a system of State forests. The necessity for State policies to meet the problem arising from an extensive breakdown of private ownership following the cutting off of the original timber is only beginning to present itself definitely, but is likely to bring about results in several States similar to those in the Lake States at the present time.

THE ORIGIN AND DEVELOPMENT OF STATE POLICIES OF FORESTRY

The history of State forestry throws much light on what can reasonably be expected of it.

HOW STATE FORESTRY STARTED

A widespread interest in forestry and demand for some form of public action on its behalf developed in the United States in the third quarter of the nineteenth century. The extensive interest in forestry which led to the inauguration of public effort for its promotion both in many States and by the National Government is shown by the following list of significant developments prior to 1885:

- 1819. Massachusetts law to encourage the growing of trees necessary for ship building by means of premiums to be offered by the agricultural societies receiving the bounty of the State.
- 1837. Massachusetts provided, in connection with a geological and botanical survey of the State, for a special report on the native trees and shrubs, keeping in view economic relations and particularly the agricultural and general benefit of the commonwealth by leading landowners to engage in forestry.
- 1846. Massachusetts report on the forest survey of the State published.
- 1861. Nebraska Territory law to encourage forest planting through tax exemption.
- 1867. Wisconsin law for a commission of three to inquire into the rate of forest destruction and its climatic effects, whether the State should regulate private forest practices, and what the State should do to preserve the forests and encourage their return.
- 1868. Iowa law to encourage forest planting through tax exemption.
Kansas law to encourage forest planting through bounty.
Wisconsin law to encourage provision of natural or planted timber belts through tax exemption and bounty.
- 1869. Dakota Territory law to encourage the artificial establishment of timber growth through tax exemption.
Nebraska State law to encourage forest planting through tax exemption.
Maine State Board of Agriculture appointed a committee to present to the legislature suggestions regarding the expediency of a State policy for the preservation and production of forest trees, and to call the attention of Congress to the same subject.
- 1870. St. Paul & Pacific Railroad began forest planting.
Kansas Pacific Railroad began experimental forest planting.
Missouri law to encourage forest planting through bounty.
- 1871. Minnesota law to encourage forest planting through bounty.
- 1872. Nebraska began observance of Arbor Day to encourage forestation.
Burlington & Missouri River Railroad began forest planting.
Maine law to encourage forest planting through tax exemption.
New York created a commission to investigate the expediency of establishing a forest preserve in the Adirondack region.
- 1873. Atchison, Topeka & Santa Fe Railroad began establishment of forest nurseries with a view to timber growing.
Federal Government passed the "Timber Culture Act" to encourage forest planting on the prairies through bounty in form of land.
Nevada law to encourage forest planting through bounty.
American Association for the Advancement of Science created a committee "to memorialize Congress and the several State legislatures on the importance of promoting the cultivation of timber and the preservation of forests," and to recommend legislation.
New York State commission recommended the holding of tax-delinquent lands in the Adirondack region to build up a State park.
Committee of the American Association for the Advancement of Science memorialized Congress for the appointment of a Federal commissioner of forestry, to prosecute investigations and inquiries.

1874. Illinois law authorized counties to offer bounties for forest planting.
1875. Idaho Territory law to encourage forest planting through tax exemption.
1876. Minnesota made an appropriation to promote the objects of the Minnesota Forest Association, which offered premiums for tree planting. Reports showed 10 million trees planted in 1876 and estimated 1877 planting of another 10 million.
- Colorado constitution provided that the legislature "shall enact laws to prevent the destruction of, and to keep in good preservation, the forests upon the lands of the State, or upon lands of the public domain the control of which shall be conferred by Congress upon the State."
- Colorado constitutional convention memorialized Congress reciting the calamitous consequences of forest destruction, the lack of Federal protection of, care for, or interest in the forests of the public domain in Colorado, and the need for forest planting in the treeless parts of the State if it were to be redeemed for agriculture and populated; and praying that the State be given control not only of "all the Government forests on our mountains but also at least one fourth of all the Government lands on our plains."
- Federal law passed inaugurating provision for forestry investigations in the United States Department of Agriculture—the origin of the present Forest Service.
1877. Southern Pacific Railroad undertook experiments in tree planting.
- Washington Territory law to encourage forest planting in two counties in the treeless portion of the State through tax exemption.
- Wyoming Territory law to encourage the artificial establishment of timber growth through tax exemption.
- Recommendations by the Secretary of the Interior that all public domain timberlands be permanently reserved and placed under administration for forestry purposes.
- Connecticut made provision for an inquiry and report upon forestry.
- Connecticut law to encourage forest planting through tax exemption.
1878. Massachusetts law to encourage forest planting through tax exemption.
- Rhode Island law to encourage forest planting through tax exemption.
1879. Nebraska law to encourage forest planting through bounty.
1881. Colorado exempted from taxation increased value of irrigated lands due to tree planting.
- New Hampshire created a temporary commission of inquiry.
1882. Vermont created a temporary commission of inquiry.
- Massachusetts authorized towns and cities to establish municipal forests.
- New Mexico Territory law to encourage forest planting through tax exemption.
1883. New York law prohibited further sales of State lands. (Through acquisition under tax sales the State holdings had risen from less than 40,000 acres in 1873 to more than 700,000 acres.)
1884. New York appointed committee of experts as a commission of inquiry.

This list shows—

(1) That shortly after the Civil War a very general belief prevailed that public action was needed on behalf of forestry.

(2) That the major objective during this period was to promote forest planting (then often called "timber culture", "tree culture", "forest culture", and even "forest orcharding").

(3) That the interest in this was keenest in the prairie region, but was by no means absent in the eastern part of the country where the natural timber growth was originally everywhere abundant.

It is worth while to ask what were the impelling forces back of the forestry movement in its formative period.

REASONS FOR WANTING PUBLIC FORESTRY

Sixty years and more ago fear of an impending timber shortage and a supposition that the forests of the country were being very rapidly swept away were widely prevalent. Local shortages had actually

developed, at various times. About the beginning of the nineteenth century, for example, a dearth or near dearth of wood supplies seems to have been experienced in many communities.

Until the railroads had spread over the country and had pushed their ramifying lines into the smaller towns and rural localities, the question of wood supplies was likely to turn on the amount available by team haul, over poor roads. Wood cannot stand costly transportation without formidable enhancement of its price. Until coal came into general use, for both industrial and domestic purposes, the requirements for fuel alone were enormous. Even in the very early days of colonial settlement local inconveniences from the depletion of supplies near at hand were sometimes felt. Throughout the nineteenth century the expressions of concern and alarm over the rate at which the forests were being cut, the havoc that was being wrought by forest fires, and the wastefulness with which timber was utilized were recurrent and insistent. Relatively few people seem to have disputed the popularly accepted belief that failure of timber supplies was approaching rather rapidly.

It is often said that frontier life bred hostility to the forest and that this soon became the dominating American attitude. It may nevertheless be questioned whether there was ever a time when many people did not regret seeing the forests wiped out or devastated, on grounds other than utilitarian. Certainly in the decade of the seventies one of the motive forces behind the forestry movement was the belief that a well-wooded country is more habitable and more attractive than one without forests. Another and more powerful impulse behind the forestry movement was the conviction that forests not only made stream flow more equable and prevented erosion and floods but also exercised a very important influence upon the climate, ameliorating its extremes, increasing its salubriousness, and adding to the rainfall. That forest denudation brought marked changes in the behavior of springs and streams had long been a popular belief based on common observation. Shortly after the middle of the nineteenth century public solicitude for forest preservation and forest extension as a means of controlling floods and beneficially affecting climatic conditions was greatly increased by influences from abroad.

In Europe the consequences of the destruction of forests following the French Revolution were awakening alarm; and Americans who had been brought into contact with foreign observations and conclusions on the subject began to make them known in this country. Outstanding in its influence upon American thought in this field was the publication in 1864 of George P. Marsh's "Man and Nature", revised and republished 10 years later under its better-known title, *The Earth as Modified by Human Action*. The agitation that was going on in France and Italy over the serious effects of deforestation upon stream flow in the Alps and Pyrenees and the conclusions of contemporary European scientists and geographers on radical climatic changes as a result of the destruction of tree growth in countries bordering the Mediterranean became a powerful influence upon American thought.

The westward march of the frontier across the prairies brought another influence to bear. The settlers in the treeless country missed

the forest to which they had been accustomed. They eagerly took up tree planting, to make the country more habitable and homelike. Still farther west irrigation was important. Soon the idea became generally accepted that the semiarid plains region, popularly included in the "Great American Desert," must be made habitable for civilized man and reclaimed for agriculture, if it was to be reclaimed at all, by means of tree planting on a gigantic scale. Thus, it was thought, the climate might be changed and the rainfall so increased as to alter the character of the whole region agriculturally.

WHY THE EARLY MOVEMENT ACCOMPLISHED LITTLE

The widespread interest in "timber culture" or "tree culture" and the efforts to promote forest planting through public encouragement and assistance did not turn into new channels the earlier current of thought regarding what forestry should primarily be concerned with in the United States. Even today, in the popular mind, the inauguration of forestry tends to be thought of as tree planting. That forestry should as a rule concern itself with established forests and that the application of silviculture is accomplished mainly through skillful utilization, which controls and directs the later growth of the forest, is a conception not readily grasped by the average man. In the seventies of the last century even those best informed on forestry and most active on its behalf gave surprisingly little attention to the possibilities of forestry as a substitute for the current practices of utilization. One reason for this was the fact that the chief early agencies seeking to promote forestry were agricultural and horticultural societies. Another was that the scientific knowledge necessary for the application of silviculture to American forests was completely nonexistent. A third was the tendency among early leaders of the forestry movement to assume that the old forests were doomed and if there were to be future forests they would have to be planted and grown, like other crops.

The very considerable effort made on behalf of forestry prior to 1885 accomplished little of permanent importance, in spite of the strong moving forces back of it, partly because of inadequate knowledge and fallacious conceptions, partly because the forms of governmental organization then established provided no suitable machinery for the kind of undertakings required. That the climate of the semiarid regions could be profoundly altered by inducing settlers to engage in "timber culture", and that if the desert were to be reclaimed for agriculture it must be by means of extensive afforestation, were of course complete misconceptions. But irrespective of whether the objectives of the forestry movement in its early stages were right or wrong, their achievement was impossible because the people of the United States had not then gone far in developing the capacity of government to meet the needs of a complex, highly organized economic life. In the latter half of the nineteenth century the field of government had to be broadened in many directions. To assume the new duties, new machinery had to be set up. The creation of the machinery necessary for the successful conduct of public activities in forestry proved a slow process—indeed, it is even now unfinished.

EARLY FEDERAL FORESTRY MOVEMENT

Before taking up the development of State forestry from 1885 on, it is necessary to bring within the field of vision what was beginning to be done by the Federal Government; for this was to have a very great influence upon the States.

The year 1876 saw the first provision made by Congress for the inauguration of forestry work as a Federal activity. It was also the year in which the first Western State asked Congress to turn over to it the timberlands within its borders. In the following year the proposal was first submitted to Congress that it should reserve and place under administration the timberlands of the public domain.

It will be recalled that the legislation authorizing the Department of Agriculture to conduct investigations in forestry and making an appropriation for this work had been sponsored by the American Association for the Advancement of Science. The law brought into being a small bureau of inquiry and information. No important departure from past policy, no commitment of Government to a new kind of activity, was involved in that. Nor was the request of Colorado that the public timberlands within the State be made over to her a proposal of an essentially new Federal policy. To dispose of the public lands, in one way or another, had always been the basic policy of the Federal Government, and for that matter of the States too. But the idea of the Government's undertaking permanent forest management was a bold and astonishing departure. It did not originate with those who had been previously active on behalf of forestry. Not only did it come from outside their number; it proposed a kind of public activity which some if not all of them had regarded as wholly out of the question.

There was every reason to hold it so. It flew in the face of accepted ideas regarding the functions of the Federal Government. It involved a reversal of the course which had been pursued with respect to the public domain from the foundation of the Union, and conflicted with the whole American tradition of individualism and preference for private property ownership. And it proposed the assumption by the Federal Government of a kind of public undertaking for which it was not only manifestly unequipped but also manifestly at that time unfitted. Moreover, it brought the proposal forward at a time when the inherent weakness of the political system as then evolved for taking on duties that called for integrity, long-range stability, and expert administration stood shockingly revealed.

The scandalous frauds and open pillage which had been commonly practiced under the public land laws were well known. They had been freely set forth in the annual reports of the Interior Department. The corruption which had invaded public life and besmirched public officials of the highest rank, involving not only members of the executive and legislative branches of the Federal Government but also of the judiciary, had been freshly and startlingly exposed. It is doubtful if there was ever a time in the history of the Republic when the morale of government was at a lower ebb and public distrust of the ability of government to serve the public welfare with fidelity, consistency, intelligence, and disinterested enterprise was deeper or better grounded. Secretary of the Interior Carl Schurz originated and brought forward what was eventually to become the national

forest policy at a singularly unpropitious time. Its immediate adoption could only have been followed by disastrous failure. Government was unprepared to assume the responsibilities involved and would have been incapable of discharging them acceptably. Nor was the proposal of State ownership and administration of the forests of the public domain much more promising. In the long run, the Colorado plan would have failed had it been adopted; and as the matter finally turned out, would have failed irretrievably. Inaction for a time finally saved the day.

Some of the reasons why permanent public retention and administration of the public-domain timberlands could not be expected to work were pointed out in the opening pages of the first Report upon Forestry published by the Agricultural Department. Under the spoils system of political appointments the civil service of the Federal Government was made up of a changing body of officeholders selected on other grounds than merit and special qualifications for the duties to be assumed, and dependent for their term of office tenure, as for their original appointment, upon their political backing. Each change of administration brought into office a new horde of untrained, inexperienced men to supplant those already filling the positions regarded as the reward of victory and the plums of the political tree. There were no trained foresters in the United States, and no educational institutions which could provide even the most elementary training in the profession of forestry. There was no knowledge of the technique and practice of forestry, and the beginning of the necessary basis of scientific knowledge were not in sight.

We have no inducements—

the 1877 Report upon Forestry set forth—

to offer a young man who might aspire to a position for which he might have great native ability, and for which he would be willing to undertake the most thorough special education if he felt assured that employment would depend alone upon the most thoroughly approved preparation, or the most rigid examination. Hence it cannot, at least at present, be expected that our governments can undertake the practical management of forests, as is done in Europe, by officials specially trained for this pursuit, with the view of deriving a benefit from the cultivation. They can scarcely do more than prevent depredations upon the timber already growing, if, indeed, they can succeed in this, * * *.

The Federal Department of Agriculture, which had been giving more or less attention to the subject of forestry in its publications prior to the time when Congress, in 1876, inaugurated the work as a permanent activity of the Department, had brought out a paper in 1866 which presented in strong terms the urgent necessity for prompt action to conserve and renew the forests of the country, and advanced a plan for systematic experiment and research to find out how to manage forests and how to establish successful and paying plantations. The author held that this—

should receive the immediate attention of our Government, and enjoy its fostering care.

But—

the experiments, to be of any value, must be continued through several Presidential terms; and in the continual changes * * * no one person would be permitted to control these experiments, to carry out to completeness thoroughly digested theories and test them in actual practice, and to avail himself of his own experiences. * * * The liability would be a defeat, through incompetence or lack of interest in the men appointed to the work, from the short periods with

which they would be connected with it, and the fact that they had no personal interest at stake in it except their salaries.

His plan therefore proposed that, instead of the Government's attempting to conduct the experiment directly, public aid should be extended to a private corporation to be created as a research agency.

In "Man and Nature", published in 1864, Marsh had said:

It is much to be feared that [public ownership and management] would be inadequate to save the forests of the American Union. There is little respect for public property in America, and the Federal Government, certainly, would not be the proper agent of the Nation for this purpose. It proved itself unable to protect the liveoak woods of Florida, which were intended to be preserved for the use of the Navy; and it more than once paid contractors a high price for timber stolen from its own forests. The authorities of the individual States might be more efficient.

If any evidence is needed of the debauched standard of political life in the era of the seventies, a single citation from the proceedings of Congress will provide it. A few weeks after the House of Representatives received the Colorado memorial one of its members, George F. Hoar of Massachusetts, stood before the Senate as one of the House managers of the impeachment trial of the Secretary of War. In addressing that body, then sitting as a court, he said:

My own public life has been a very brief and insignificant one, extending little beyond the duration of a single term of senatorial office. But in that brief period I have seen five judges of a high court of the United States driven from office by threats of impeachment for corruption or maladministration. I have heard the taunt, from friendliest lips, that when the United States presented herself in the East to take part with the civilized world in generous competition in the arts of life, the only product of her institutions in which she surpassed all others beyond question was her corruption. * * * When the greatest railroad of the world, binding together the continent and uniting the two great seas which wash our shores, was finished, I have seen our national triumph and exultation turned to bitterness and shame by the unanimous reports of three committees of Congress—two of the House and one here—that every step of that mighty enterprise had been taken in fraud. I have heard in highest places the shameless doctrine avowed by men grown old in public office that the true way by which power should be gained in the Republic is to bribe the people with the offices created for their service, and the true end for which it should be used when gained is the promotion of personal ambition and the gratification of personal revenge.

The American Association for the Advancement of Science, in taking action to make known to Congress its recommendations that a Federal agency should be set up to promote practices of timber growing throughout the United States, did not contemplate an organization charged with duties of administration. The association acted after, and presumably was induced to act by, the presentation of a paper "On the Duty of Governments in the Preservation of Forests." Although this paper pointed out that the questions involved "are not limited to a particular State, but interest the Nation generally," the action proposed for the association was that it should bring the subject of protection of the forests, and their cultivation, regulation, and encouragement, "to the notice of our several State governments, and Congress with respect to the Territories." The committee of the association which drafted a memorial to Congress seems to have sought the creation of an independent commission of forestry headed by a commissioner with a function paralleling that of the Commissioner of Agriculture and the Commissioner of Fisheries. What was contemplated and shortly brought to pass, in other words, was the setting up of a central clearing house of information

and bureau for conducting statistical and other inquiries and organizing research. The number of States which already had begun to move in the direction of State encouragement of forestry, the movement under way in other States looking to similar action, and the conception then generally held of the respective spheres of action of the Federal Government and the States doubtless worked together to inspire the belief that the actual organization of whatever administrative activities might be found necessary would and should be provided for under State legislation and through State organization.

The provision actually made by Congress for the new activity was at first most meager and for a quarter of a century too insignificant to permit of any great expansion. The clearing house and bureau of information was at first a purely one-man affair. Nevertheless, as time went on the work began to get on its feet, and by the close of its first decade had reached the point at which it was capable of real usefulness as a central agency for promoting the forestry movement throughout the country.

The bold advocacy by Secretary of the Interior Schurz of the inauguration by the Federal Government of forestry administration of the public-domain timberland had an instantaneous effect on the conservationists of that period. The proposal was forthwith adopted as a part of the forestry program for which the support of the country was being sought. Bills looking to the inauguration of Federal administration were introduced into Congress in increasing number and with increasing support from without Congress. On the other hand, the opposition of antagonistic Western interests created obstacles too great to be overcome down to 1891, when there crept through unnoticed, in the crowded closing hours of the session, a briefly worded amendment authorizing the President to establish forest reserves.

It is now time to turn back to the development of State forest administration.

THE FIRST STAGES OF FORESTRY ADMINISTRATION BY THE STATES

Down to the year 1885 no governmental agency had been set up in the United States to undertake duties of an administrative character with respect to forestry, and no State had inaugurated forestry work as a continuing activity. After nearly 20 years of widening agitation, which had borne fruit in legislation by nearly half the States and by the Federal Government, almost nothing of real importance had been accomplished. The forestry movement had got off on a false start. It had formulated and pursued ill-advised objectives, and it had selected impractical means to attain them. The only form of public action which it had been able to propose and get adopted with a view to meeting public needs for future timber supplies or providing the country with ample new forests was to pass laws extending inducement and encouragement for tree planting by private landowners; and while millions of trees had been planted, little of permanent value had resulted, from the standpoint of finding a practical answer to the country's forest problem.

This is not to say that tree planting in the naturally treeless prairie and plains region of the West failed to produce substantial results. Those who settled and built up the country felt the need of trees for

shade, protection, and wood; and as their homes and villages multiplied the bare aspect of the prairie was broken and gradually transformed. Planted woodlots, shelterbelts, and shade trees marking the farmsteads and the villages now so plentifully dot the landscape of the eastern prairie region that it no longer appears to the passing traveler like a naturally treeless country, and seems not greatly different from the originally wooded East. Not only has the early desire of those who sought to promote tree planting throughout this region been largely realized; the planted timber growth is of appreciable economic importance as a source of wood supply for local requirements. But the afforestation movement in the West owes very little to the laws in aid of timber culture through bounties, tax exemptions, and land bestowal passed under the impulse of the early forestry movement. In fact, the laws soon proved valueless and unsatisfactory in their actual working, and most of them were eventually repealed.

In 1885, however, the forestry problem began to be attacked from a new angle. In that year four States—New York, Ohio, Colorado, and California—created forestry organizations charged with the conduct of specific functional activities on behalf of the States. This was the beginning of State forestry administration.

Only in New York did the initial forestry organization prove permanent. In Ohio a promising start lost headway after a few years, with the result that the work was discontinued in 1890. In California an originally energetic organization got into political hot water and, after an existence of 8 years, was abolished. In Colorado the new venture in State government had a still more ignominious history. Practically it was a still-born thing. Although for a few years it functioned to some extent as an agency to promote interest in forest preservation, the administrative responsibilities contemplated by the law could not be discharged, partly because the law itself was unworkable, partly because of lack of appropriations to sustain the organization theoretically created.

The failures in Colorado and California are instructive. They are the two Western States in which there existed at that time a definitely crystallized and fairly vigorous State movement for forestry. In both States the principal ground of interest was the value of water for irrigation and fear of the results of forest destruction in the mountains—though in both States also the question of permanent timber supplies and the terrific wastefulness and destructiveness with which the forests were being assailed entered in considerably. Further, in both States the crux of the difficulty in trying to formulate a program of public action to preserve the forests was the fact that they were principally a part of the public domain.

The difficulty thus created was not merely the lack of authority of the State over Federal holdings. It was the powerful antagonistic interests adverse to forestry which stood to benefit from Federal inattention, indifference, liberality of the laws relating to the disposal of public lands and the use of timber from them, and laxity in the administration of these liberal laws.

Both the strength of the conservationists in Colorado and the insuperable difficulties confronting them when they attempted to bring about the actual adoption and application of constructive measures are evidenced by the bare facts. That the deep solicitude

on behalf of forest preservation expressed in the memorial to Congress adopted by the Colorado Constitutional Convention in 1876 was genuine seems unquestionable. The mandate of the State constitution requiring that the legislature should enact laws both "to prevent the destruction of, and to keep in good preservation, the forests upon the lands of the State, or upon lands of the public domain the control of which shall be conferred by Congress upon the State", was another expression of the same solicitude. But the enactment by Congress of laws working in the opposite direction was very actively aided by men elected to that body from Colorado; the laxity of the administration of the public land laws under Secretary of the Interior Teller—a Colorado man—between 1882 and 1885 was outstanding; and not until the latter year did the legislature of Colorado give heed to the constitutional mandate. The law then passed provided for the appointment of a forest commissioner to have care of the woodlands of the State, to protect them against trespass and fire, and to make and publish reasonable rules and regulations for their protection and for the conservation of forest growth; but this was principally a gesture. A prominent citizen of the State who was for years among the most active advocates and backers of forestry was appointed Forest Commissioner, serving at first with no salary at all, but was unable to accomplish anything of importance; and about 1891 the effort was halted through discontinuance of the appropriation. Thus came to an end the first effort to establish forest administration in Colorado.

Before leaving the subject it should be said that the law made county commissioners and road overseers forest officers who should guard against fire and depredation, with authority to arrest offenders; the expenditures in any county for protection of the forests were limited to \$100 in any year.

California made a more impressive record. Its "State Board of Forestry" was the first agency designed to be of permanent character created by any State to have charge of its forestry interests. The board comprised three unsalaried members, with authority to appoint a salaried secretary and with an appropriation of \$5,000 for the first biennium. With the second biennium the appropriation was increased to \$29,500. The duties of the board were to collect and disseminate information, to conduct investigations and experiments, to encourage the preservation and planting of forests and the maintenance of water resources, and also to assist in enforcing and carrying out all National and State forestry laws.

The board proceeded with much energy and ability to develop a highly promising, comprehensive program, and to build up an organization. In 1887 its officers and employees were endowed with the powers of peace officers for making arrests when laws applying to forest or brush lands within the State were broken. A body of agents was created to aid in law enforcement and protection against forest fire.

In California, as in Colorado, the inertness of the Federal Government in protecting the public domain timberlands from spoliation and the great ravages of forest fires created sentiment for State ownership and administration of the public domain timberland. An expression of this sentiment took the form of a bill introduced into Congress and reported favorably by the Public Lands Committee, in 1887, to withdraw from sale public domain forest lands in California

not suited to agriculture, and to place them temporarily under the management of the State Board of Forestry.

For the biennium 1891-92 the appropriation of the California State Board of Forestry was increased to \$30,000. But the board was getting into difficulties. In September 1890 a significant resolution was adopted by the American Forestry Congress. It recited that the board was both—

charged with the forestry interests of [the] State in general, and with the protection of the timberlands of said State against fire and depredation,

etc. But—

it has been suggested that political considerations may lead to a discontinuance of said board, or to such a reduction of the appropriations provided for such board as must necessarily hamper its work and curtail its usefulness.

The Congress viewed

with alarm the possible occurrence of such a contingency, rooting out, as it were, the first germ of a rational forest policy, which the State of California had wisely planted, and cannot without detriment to its agricultural interests afford to discontinue—

and accordingly provision was made

that a copy of these expressions of interest in the forest policy of the State of California be forwarded to the governor and legislature of the State of California.

In 1893 the board was abolished, and a most promising effort to build up a State organization for the protection of the publicly owned timberlands (mainly Federal, of course) in California was brought to an end. There had been a collision with conflicting interests. The principal effort of the board in protection was directed at law enforcement. It sought to get the goods on timber thieves and fraudulent entrymen. The State itself had its school lands, which were being very rapidly acquired by private owners. The rush of eastern lumbermen to build up great private holdings in the West Coast States had set in. And there were the sheepmen. Said the report of the executive officer of the board in 1892:

Sheep raising and timber cutting are legitimate pursuits and entitled to fair treatment, but as conducted in California for many years they have not been conducive to the general welfare. The millman has slashed the forests recklessly, wasting more than he used, and not confining his operations to his own property. The sheep herder, caring only for pasturage, has set fire to the brush annually, burning off the young growth and killing the large trees. The seedlings and shoots that escaped the forest fires were destroyed by the sheep. And so not only has the mature forest been greatly injured, but the total extinction of the forest growth made inevitable unless the work of devastation be stopped.

Arrayed on the other side, and deeply convinced of the necessity of forest preservation, were the agricultural interests of the State. "California has been awakened", said the same report—

to at least a partial recognition of her danger by the necessity of organizing and perfecting a system of irrigation for the development of her arid plains. She has discovered that water will make gardens of her deserts, and that the key to future prosperity and greatness is irrigation. Now she turns to the Sierra Nevada as the storehouse of her wealth. The mountains that yielded the gold that made California rich in the early days contain the sources of greater and more enduring wealth. The water flowing in California rivers is more precious than the gold lying hidden in their sands. So long as the forests cover the mountain sides, the streams will flow with some evenness throughout the year; but when the forests disappear, the rivers will become rushing torrents in the spring and dry arroyos all the rest of the year. The forests of the Sierra Nevada are the natural reservoirs for irrigation of the San Joaquin Valley.

The opiate administered to the State forestry organization in 1893 remained potent for 12 years. Its Rip Van Winkle slumber ended with the act of March 18, 1905, creating anew a State board of forestry, and under it the office of State forester. The first report of the State forester contains this paragraph:

From 1893 to 1903 forestry in California was at a standstill, yet this period was one of marked need and of rapid development along other lines. It was the decade during which the lumbermen from the Lake States and southern pineries flocked to California to invest in timberlands, and during which time California disposed of the bulk of her sole forest possessions by the sale of school lands at the ridiculously low price of \$1.25 per acre. Similarly it was the period during which land fraud flourished, whereby much of the public timberland in California was lost to the National Government and the State.

The date of 1903 in the preceding paragraph calls for explanation. The national forestry movement had not been dormant during the previous decade. The feeble and ill-supported, though valiantly struggling, little bureau of information officially known as the Division of Forestry of the United States Department of Agriculture had been transformed into the strong, rapidly growing, nationally observed Bureau of Forestry, in the same Department. In 1903 the California Legislature made provision for the undertaking of a thorough investigation of the forest resources of the State by the Federal Bureau of Forestry, under a cooperative agreement by the terms of which the cost of the survey was borne equally by the Federal Government and the States. As a result of this investigation, measures were formulated and recommended to the State legislature in the form of a bill which led to the act of March 18, 1905.

For Ohio, the story of its short-lived first forestry bureau can be much more briefly told. It was a case of good seed dropped on too shallow soil. In the early eighties there were evidences of marked forestry interest in the State, with enthusiastic leadership. The legislature created in 1885 the Ohio State Forestry Bureau, as a central office for the promotion of forestry, with headquarters at the State university, and with a frugal appropriation of \$1,000. It was charged with the duties of inquiring into the extent and character of the forest resources of Ohio and investigating the causes that are operating to destroy the forest; of suggesting legislation; and, permissively, of establishing a forest station on the university grounds, with the consent of the university trustees. Six successive annual reports testify to the activity and diligence with which the secretary—said to have studied forestry in Europe—endeavored to gather and diffuse information. Presumably waning interest due to the dropping off of the leaders in the State forestry movement was the cause of the extinction of the bureau in 1890.

And, finally, New York.

The State forest policy of New York has been throughout *sui generis*. In less degree than in any other State has it been subject to external influences. Throughout it has been a policy developed by the State to meet its own conditions and in response to its own felt needs. And to a greater degree than in any other State it has centered in and been mainly preoccupied with State forest-land administration.

As early as 1868 public advocacy of a policy of reservation for lands of the State in the Adirondacks began. Sale of these wilderness lands had been going on from the latter part of the eighteenth century,

at low prices. The lands were bought for the sake of their standing timber where and when lumbermen saw a chance for a profitable operation. But after as much of the timber as was valuable at the time had been cut off, the lands were often allowed to revert to the State through nonpayment of taxes. When through added growth or advancing lumber prices they become valuable again, they were rebought to repeat the process. In his annual message of January 1, 1884, Governor Grover Cleveland pointed out how, under the established procedure for dealing with tax-delinquent lands, owners who from the first day of their ownership had refused payment of all taxes had from 7 to 12 years in which to cut off and sell the timber before the State foreclosed on the land. Twelve years before this message the legislature had appointed a temporary commission of inquiry; but its recommendations had languished until 1883. In that year the legislature put a stop to the revolving system of alternate public and private ownership; and in 1884 it authorized the comptroller to employ "such experts as he may deem necessary to investigate and report a system of forest preservation." The commission was headed by Prof. Charles S. Sargent, of Harvard, and made its report the following year. Opposition said to have come partly from lumbering interests resulted in the passage of a compromise act, the law of 1885, establishing a permanent forest commission to "have the care, custody, control, and superintendence of the forest preserve", and generally to promote forestry throughout the State by means of various specified activities.

The law of 1885 also put into effect a system of organized fire protection for both public and private forest lands within the State, the provisions of which will be discussed later.

The task imposed upon the Commission at the outset with respect to the State lands was of Herculean proportions. From time out of mind these lands had been subject to depredations, often highly lucrative to those engaged in them, and similar in many ways to those to which the Federal public domain was exposed. It is improbable that the members of the Commission, at the time of their appointment, were under any illusions regarding the unpopularity with which any whole-hearted attempt to enforce the laws against stealing timber from the State lands would be received, and the hornet's nest that honest performance of their duties was bound to stir up; but if they were, their minds must have been very promptly disabused. Local custom confirmed by State complaisance had given the lands virtually the status of public commons, in the eyes at least of those who lived in their general neighborhood; and the business interests which stood to lose by a sudden drying up of the supply of bootlegged logs were certain to be heard from by the Governor's appointees. That their course had aroused both resentment and opposition the words of their second annual report bore testimony to, in a passage which said:

The Commissioners, of course, could not have remained in ignorance of the fact that in the performance of the official duties with which they were charged they have incurred the suppressed ill-will in some cases, and in others the open hostility of those with whom they have been compelled to deal. * * * They are conscious that they have intentionally given offense or caused injury to no man, and that in all instances they have pursued their work with none but the kindest feelings, exercising at the same time as much leniency and forbearance as was compatible with the ends of justice. While, on the one hand, they have shown no favoritism, so, on the other, they have shown no hostility and felt

none. * * * On the other hand, they cannot but feel gratified at the high commendation which has been passed generally upon the course that they have pursued and at the great interest that is everywhere felt in the work in which they are engaged.

Of the varied kinds of "bold and knavish attempts to plunder the State" which "the Commission is attempting to stop" a single illustrative example may be cited.

It has been shown by figures that during the years 1871 to 1876 one individual cut from State land 52,131.91 market logs, valued at the lowest estimate at more than \$52,000. He was only one of many who were engaged in this work of plunder during the same period, and was by no means the largest operator. What is true of the years before specified, is true of the succeeding years, and of how many preceding years is and must remain unknown.

The Commissioners had their difficulties, too, in finding the right men for the various local positions which they had to fill. The Federal Government had, through the enactment of the civil service law of 1883, taken a small first step toward the introduction of the merit system, as a means of obtaining competent civil servants and preventing the influence of politicians from getting or forcing on the public pay roll incompetent or otherwise unfit men; but "snivel-service reform" was anathema to all practical politicians and had many ups and downs to go through before State authorities were even to begin to take it seriously. Since—

the Commissioners could not possibly have such an extensive acquaintance throughout the 14 counties of the forest preserve as to enable them to select men from a personal knowledge of their qualification,

they had to—

rely largely upon the recommendations of known and trusted men throughout the different localities from which the foresters were to be chosen. To say that under these circumstances some mistakes in making selections were possible is simply to utter a truism. * * * Many applicants were pressed upon the Commission for appointment, with the best intentions doubtless, whom the Commissioners felt compelled to reject as being, in their opinion, unfit for the services required of them.

Multitudinous other difficulties incidental to defining the objectives, laying out the plans, and building up the organization for a public enterprise wholly new and undefined in character, with no precedent to guide and very little information to enlighten them, had also to be dealt with.

The science of forestry in America is yet in its swaddling clothes—it is, perhaps, a risk to assume that its toilet is so far made as that. Even the practical business matters that have been presented to the Commission for investigation and settlement * * * involved substantially new questions, demanded much investigation, were beclouded with much loosely woven legislation, and were often entangled in such contradictory enactments, opinions, discussions, and rulings as to render it difficult to find a clue out of the labyrinth.¹

Moreover, it was difficult to establish the location and extent of the land owned by the State.

The forest preserve is made up of many disconnected plots, more in some counties than in others; plots, ranging from a few acres up to many thousands, surrounded usually by lands owned by individuals and in many cases inaccessible by roads. * * * There are large tracts in which the State owns but an undivided interest, one half, one third, or one fourth, as the case may be, and instances are on record where individuals thus owning with the State have not waited for a partition, but have gone on and lumbered the whole.²

¹ Annual Report of the Forest Commission of the State of New York for 1886, p. 7.

² Annual Report of the Forest Commission of the State of New York for 1885, p. 17.

The second annual report of the Commission quoted from one of its inspectors:

The State in past years has expended large sums of money with the view of correctly locating its lands according to the original surveys and of furnishing a correct map, drawn to such a scale that individual plots are plainly shown. That this has never been accomplished those best know who have had occasion to investigate the matter. * * * Many examinations of State lots have been made during the past season, but in every case it required an expert to locate the corners or lines.

Experts were either old residents who themselves had worked out the lines or persons familiar with the local condition, "handed down with other matters of local importance", regarding property boundaries. Most of the surveys establishing the lines and corners had been made in the latter part of the eighteenth and the early part of the nineteenth century. Trees were marked for corners, with the true corner marked by a stake ("the perished monument of an hundred years ago"), supplemented by a corner marking on some tree near at hand. In marking the lines between the corners, trees were blazed both on the true line and on trees each side of the line. Through the death and fall of many of the marked trees, the accurate reestablishment of the original line, in many places almost entirely and sometimes purposely obliterated, became a very difficult task.

THE NEW YORK PROBLEM OF OBJECTIVES

The major problems with which the commission had to grapple during its first several years, other than those relating to building up a suitable form of organization, were problems having to do with land acquisition and land retention, and the protection of the State land and timber against spoliation and fire. That the State lands badly needed blocking up has already been shown. At the time that the policy of State retention of tax forfeited lands was inaugurated, it was assumed that further tax forfeitures would continue to operate as a means of extending and consolidating the State properties. In point of fact, the adoption of the State policy came just at the time when the tide turned. The Adirondack region was about to enter a period of rising land and timber values. As a recreation region, it was to change from an undeveloped wilderness paradise for hardy sportsmen into a resort country of hotels, cottages, private estates of wealthy men, extensive private club hunting grounds, and all that goes with popularity as a summer playground and fashionable watering place. Instead of getting more land through tax reversions, the commissioners found themselves losing a good deal of the land already obtained. Laws passed in the days when the main anxiety of the State was to get rid of its land made it possible for many claimants to attack the State's title, on the flimsiest kind of evidence.

There can be little doubt—

Said the commission in its report for 1888—

that many applications for both cancellations and redemptions of the State's title have been based upon fraudulent affidavits and misrepresentation of facts, and that many such fraudulent applications have been successful.

Defense of the State's property against the pillage of its timber raised other difficult legal problems. Until the commission had its hands less full in trying to hold the property of the State against

adverse claimants and prevent its spoliation, it could not do much to develop constructive plans for its future use.

One thing, however, was obvious—that some way to block up the scattered and broken holdings of the State must be found, if they were to be effectively administered. A small first step in this direction was taken in 1887, by amendment of the provision of the 1885 law under which none of the land of the forest preserve could be sold. The amendment permitted sale to the highest bidder “of separate small parcels or tracts wholly detached from the main portions of the forest preserve and bounded on every side by lands not owned by the State”, the proceeds to be invested in the purchase of forest land “adjoining great blocks of the forest preserve now owned by the State”; or the isolated small tracts might be exchanged for land adjoining the main holdings. The following year (1888) the commission asked the legislature to make an appropriation annually for land purchases, at a price not to exceed \$1.50 per acre. This opened up in earnest the question, What were to be the objectives of State administration?

That the most important purpose was to conserve and regulate the water supply was universally accepted. That the forests of the Adirondack Plateau exercised other beneficial influences which made their preservation essential for the general welfare was also fully accepted. That their recreational and health values were further reasons for preserving them also went without dispute. Beyond these ends the law of 1885 had not definitely looked. In essence, that law had simply said that the State should dispose of no more forest land, and that the destruction of the forests on the State lands should be stopped. This, the Forest Commission said in its 1888 report, “has been termed ‘forestry’, but that is a too wide and sometimes a misleading term.” The “forest preservation” contemplated by the act—

could then have implied little more than an attempt to secure the forests from the ax of the lumberman, and from the torch of the careless or willful incendiary.

In this, however, the legislature had drawn back from the course recommended by the Forestry Commission of 1884. For that commission had had in view also the perpetuation of the industries dependent upon the forests for wood, and the permanent production of forest products through the practice of forestry.

“The Adirondack region”, the report of the 1884 commission had said—

if the experience of other countries in forest management teaches anything, could be made to maintain and increase, under a wise and comprehensive policy, the annual output of lumber without serious injury to the forests as reservoirs of moisture or as health resorts for the people; and it is clearly in the interest of the owners of forest property as well as for the people of this State to encourage the adoption of any system of management which will insure such results.

Accordingly, their recommended bill included express provision for the disposal by the commission “of such timber, standing or cut, as shall have grown to an age which renders it advantageous for the general preservation of the forests that the said timber should be removed” in accordance with such conditions as the commission might fix.

It is true that the law of 1885 afforded some basis for construing it as designed to permit, or at least as not entirely prohibiting, forest

management. While the lands of the forest preserve must "be forever kept as wild lands", the commission was—

to maintain and protect the forests now on the forest preserve, and to promote as far as practicable the further growth of forests thereon;

the commission was authorized to prescribe rules or regulations for the use, care, and administration of the preserve; and a subsequent section directed the commission to pay over to the treasury of the State "all income that may hereafter be derived from State forest lands." However, the commission plainly felt that before it could undertake to sell any timber from the preserve it must have further legislative authorization. In its 1892 report a draft of recommended legislation was incorporated authorizing the sale of spruce and tamarack having a diameter of 12 inches or more, and of poplar without a diameter restriction. Two years earlier the commission had suggested the possibility of acquiring land for purposes of blocking up through exchanges of timber for land, with the cutting limited to the softwoods and the same 12-inch diameter limitation. That this suggestion would meet with opposition, however, was evidently realized.

Your commission is fully appraised of the prejudice that exists in many quarters against selling trees of any sort, and under any circumstances, in the Adirondack forest.

The report of the commission continued—

Considering the manner in which trees have been heretofore cut, and the devastation that has been wrought by crude and thoughtless methods, this prejudice is not surprising; nevertheless it is a prejudice. * * * No scheme of forestry is complete that does not contemplate the preservation and cultivation of timber for the sake of wood to be used for merchantable purposes * * *. Forestry is not opposed to having trees cut down in the proper way. They must be cut to supply the world with timber. * * * It is the unwise, improvident, stupid method, or want of method, by which the cutting has heretofore too often been done, that is deplored.

And so on.

The "prejudice" which it was thus sought to dissipate was not confined to New York. It was to find expression not much later in Congress, during the discussion of proposed legislation to permit sales of timber from the Federal forest reserves. In 1891 Congress authorized the President to establish forest reserves; but not until 8 years later was any provision made for their administration. In the interval the friends of forest conservation directed their principal efforts toward getting the necessary legislation through. Inasmuch as water conservation held overwhelmingly the first place, in the eyes of the West, as a reason for having forest reserves, to open them to lumbering seemed to many not merely dangerous but a complete abandonment of the reserve policy. As one Congressman put it—

You might as well turn a dozen wolves into a corral filled with sheep and expect the wolves to protect the sheep as to expect your timber to be protected if you permit the lumbermen to go upon the reservation at all.

While unfamiliarity with the practices of forestry doubtless in part explained this attitude and fear, it is far from being the whole explanation. In very large part the basis of the fear was the distrust, based on long experience, of the ability of any body of public servants to maintain against pressure and corrupting influences a high standard of competence, vigilance, and integrity. Indeed, a good many of the

forest conservationists, who were trying to get Congress to allow the practice of forestry on the Federal forest reserves, had the same qualms. They were much inclined to have the job of administration turned over to the Army, on the ground that only so could a professional spirit and a reasonable expectation of honesty be assured. That the citizens of New York should feel less distrust concerning what might happen if their own civil servants should be entrusted with the business of selling the State's timber, or any part of it, was hardly to be expected.

NEW YORK'S DECISION FOR THE ADIRONDACKS

But besides these negative reasons against opening the Adirondack forest to timber cutting, there was a powerful positive one. The State was making up its own mind on what it wanted done and not done. Early in the year 1890 the Governor of New York had placed before the legislature the need for consolidating the State's scattered holdings and had suggested that steps be taken to work out a plan for a compact State park in the Adirondacks, from 50 to 70 miles square. Thereupon the legislature directed the Forest Commission to take the whole matter under consideration and make a report on it. Public opinion rallied strongly behind the proposal. It soon became evident that what the people of the State of New York chiefly wanted was to have the Adirondack wilderness, with its mountains, lakes, and woods, kept and maintained as a great recreation area, and that the public was inclined to regard timber utilization of any kind as conflicting with this purpose.

Governor Flower's term of office brought a showdown. He advocated a policy designed to obtain from the State's holdings a substantial revenue through sales of timber and through leasing sites desirable for private residences and camps. The legislature, in carrying out his recommendations, wiped out of existence the old Forest Commission, set up a new commission of temporary character with provision that after 5 years its powers and duties should pass to the State department of agriculture, established the Adirondack Park, authorized the sale of lands outside the park with use of the proceeds for the purchase of lands within the park, and permitted the Forest Commissioners to—

sell any spruce and tamarack timber which is not less than 12 inches in diameter at a height of 3 feet above the ground, standing in any part of the forest preserve, and poplar timber of such size as the Forest Commission may determine

and to lease within the Adirondack Park tracts of 5 acres or less for the erection of camps or cottages; these proceeds also to go into the land purchase fund.

Governor Flower thought that in time the State should be able to derive a large portion of its revenues from its forest properties. But he had greatly mistaken the public temper. The criticism and protest took organized form, and upon the convening, in 1894, of a convention to revise the State constitution it brought about the incorporation in that instrument of an absolute prohibition of any cutting of timber from the State lands, or of any leasing of these lands.

The plans for selling timber from the New York Forest Preserve drew sharp fire not only from those who were against utilizing the

timber in accordance with the methods of forestry but also from those who wished it done. For, as foresters were quick to point out, the plans for utilizing the timber ran quite contrary to sound principles of forestry practice. The Forest Commission made the mistake of trying to devise and put into effect plans for timber growing and harvesting without technical experience or outside advice. The State had not succeeded in creating an organization meriting public confidence either in its competence to apply practices of forestry wisely or in its ability to maintain high standards of integrity. Immediately after the constitutional amendment was adopted *Garden and Forest* (a publication conducted by Prof. Charles S. Sargent) said in comment:

No doubt the adoption of this amendment was made easier by the revelation of corruption in the administration of the forest lands which had been made during the week by the comptroller of the State. These revelations show that there has been fraud and bribery in the transfer of lands and much cutting of timber in the State forests which was not only illegal but the result of conspiracy between trespassers and public officers. The adoption of this amendment certainly demonstrates an increased interest in the subject of forestry, and it may relieve the forests from some danger. Nevertheless, we consider it a misfortune that such a provision should be imbedded as a principle in the fundamental law of the State. It assumes (1) that there is no such thing as rational and conservative forestry, or (2) that a civilized American community cannot be trusted to organize and develop any such a system of forest practice, either because our people lack the intelligence to do this in a scientific way, or because they lack the moral fiber to administer such a trust without official knavery and speculation.

FURTHER DEVELOPMENT OF FOREST ADMINISTRATION IN NEW YORK, TO 1915

But the people of the State of New York had still to learn that a legislative decree, even when clothed with supreme authority through its embodiment in a constitutional amendment, is not self-enforcing. That public sentiment throughout the State was whole-heartedly in favor of saving the Adirondack Forest and building up a great consolidated State park for public use is unquestionable. Practically the entire press of the State backed the policy. It was not the absence of public interest, but the presence of private interest, that made the outcome uncertain.

Public property of any kind that is worth getting hold of inevitably invites predatory attack, as honey draws bees. Because the people of New York felt that they could not safely leave the destinies of the State park within the power of the legislature to determine and modify, they set up the powerful safeguard of the constitutional amendment. To bring about its passage by the Constitutional Convention of 1894, and subsequently to watch over its observance, influential organizations had entered the field. Among these was the Association for the Protection of the Adirondacks. The fifth annual report of this association, covering the year 1905, set forth the results of an investigation initiated by the governor in view of certain findings which the association had laid before him. The report said:

As the official investigation progressed, the facts already gathered by the association's assistant secretary in his personal visit to the woods were more than confirmed. It was found that between 15 million and 16 million board feet of timber had been removed unlawfully from State land during the preceding year with the knowledge of the authorities whose duty it was to prevent it, and that it was done under a well-understood system of friendly cooperation by which the trespassers were permitted to go through a form of confessing judgment and

paying for the timber at a rate so low as to make the transaction profitable to the trespassers. Not only was the mandatory legal penalty of \$10 per tree not exacted but the so-called confessions of judgment for the larger trespasses were made before justices of the peace in a manner not allowed by law, and the timber was removed from State land in direct contravention of the constitution and the opinion of the attorney general given to the Forest, Fish, and Game Commissioner.

It is unnecessary for the present purpose to follow much further in detail the gradual evolution in New York of forest land administration as a successful State activity. There were still many vicissitudes to be gone through before the administrative organization emerged as an agency of State government accorded, and deserving of, the full support and confidence of the people. Progress was made more difficult for a time by the fusion which combined into one department the forest commission and the fish and game commission. Until within relatively recent years State fish and game departments have practically everywhere, by common acceptance, been integrated with the State political machines. Efficient management of great public forest properties calls for their specialized administration by men of suitable technical training and professional spirit and background. The discharge with competence, impartiality, and sole allegiance to the public welfare of functions of trusteeship is involved. To assure a proper continuity and stability of management, as well as to have throughout the organization good discipline and diligence, the selection, promotion, and retention of men must be governed by their ability and performance within the organization, not by outside considerations or influence. Political machines and business machines do not admit of successful combination. They should run separately. The story of State forest administration in New York during the 20-year period which began with the adoption of the constitutional amendment was epitomized by the author of *A History of the Adirondacks*, Alfred L. Donaldson, in the following terms:

These were lean years for the forests. They were years of almost unceasing, though unsuccessful, attacks upon the new amendment. They were years of much lax administration, resulting in enormous lumber thefts and much questionable surrendering of the State's title to its lands; they were, worst of all, years of the most extensive and destructive forest fires. The lesson of all these losses was driven home, however, and the dawn of new era began.

The same author painted this dawning in a passage which, somewhat abbreviated, records the narrative thus:

The sensation of the year [1914] in forest circles was sprung in December, when Governor Glynn appointed Patrick McCabe, of Albany, * * * as one of the three conservation commissioners. * * * Men high up in the councils of the Democratic Party protested against the appointment, but in vain. * * * The *New York World* said in part:

"McCabe is the boss of Albany. He has been one of Murphy's staunchest supporters since the latter assumed the leadership of Tammany Hall. * * * He is the most practical of practical politicians, a spoilsman and reactionary of the most pronounced type, ready to stand for anything and everything that Murphy decrees."

This indefensible appointment became a direct influence in bringing about changes in the conservation law that legislated Mr. McCabe out of office the following year.

* * * * *

In his inaugural message [of January 1915] Governor Whitman urged certain changes in the conservation law, the most important of which were summed up as follows:

First. A single-headed commission.

Second. A strict requirement in the law that the administrative head of each department should be a trained expert.

Third. A strict requirement in the law that all of the important subordinates shall be trained experts, appointed in accordance with the provisions of the civil service law.

The resulting law, passed April 16 of the same year, provided for a single conservation commissioner to be appointed by the governor for a period of 6 years, at a salary of \$8,000 a year. The commissioner had power to appoint a deputy commissioner, also a superintendent of forests, who would become chief of the division of lands and forests; a chief game protector, who would become chief of the division of fish and game; a division engineer, who would become chief of the division of waters, and various other subordinates.

THE ORIGIN OF THE "CONSERVATION DEPARTMENT" IDEA

New York was not the first State to place its forestry work in a "conservation department", nor did the law of 1915 provide the first set-up in New York of a department designated by this title—the conservation law of 1911 had combined the forest, fish, and game commission, forest purchasing board, State water supply commission, and the commissioner of water power on the Black River into a new department, headed by a State conservation commission of three members. During President Roosevelt's administration the conservation movement had swept the country, and one of its consequences was a strong trend toward bringing together various more or less related State activities in conservation departments of various types. Two distinct and somewhat conflicting conceptions of the field and objectives of conservation manifested themselves in the form of set-up, and largely explained the divergence in their types.

The Roosevelt conservation movement had had to do with, primarily, the great basic natural resources of the country. Its concern was for the main foundations underlying and supporting the economic life and material welfare of the Nation. To the end that the Nation might long endure as a great power in the family of nations and as a happy and prosperous people, the conservation movement sought to assure the perpetuation, through wise and farsighted use, of the natural resources capable of perpetuation, and the husbanding through wise use of the wasting resources. In the White House conference of 1908 and the work of the Roosevelt Conservation Commission which grew out of it, a classification of natural resources was made under the four heads of minerals, lands, waters, and forests. Some of the State conservation departments tended to follow along the line suggested by this general conception.

In a way this was a revival of a trend which had appeared in some States in the very earliest stages of the forestry movement. It was exemplified in North Carolina, New Jersey, and several other States in which the Geological Survey was made the agency of the State to undertake the gathering of information on the forest resources. Departments of "conservation and development" expressed this idea. But in the popular mind conservation rapidly drifted away from the basic conception of the Roosevelt movement and associated itself with such things as the protection of wild life, landscape, scenic and natural wonders, and outdoor recreational opportunities; not rational and farsighted development of the best economic potentialities of ma-

terial resources, but holding the despoiler in check and turning aside the march of civilization in the interest of the nature lover and of nature herself, or in the interest of sport and enjoyment of life in the open. A form of organization based on the idea that this is what conservation means has sometimes had an unfortunate effect upon forestry work, by placing it in association with activities of a different purpose and in charge of men whose background, interests, and training do not well fit them to understand the problems of forestry.

THE DEVELOPMENT OF STATE FORESTS IN PENNSYLVANIA

In Pennsylvania, as in New York, a policy of State acquisition and administration of forest land has from the outset held the most important place in its forest activities. Through the persistent missionary work on behalf of forestry which Dr. J. T. Rothrock had for many years been doing all over the State, an excellent groundwork of intelligent public interest had been laid before the forest policy was inaugurated. Heartily supported by each successive Governor, Dr. Rothrock as the first Commissioner of Forestry was able to bring about rapid progress in the building up of a system of State forests, the extension of which is still going on. The acquisition policy was entered upon in 1897, through authorization of the purchase by a commission of wild lands desirable for reservation by the State, if they could be had without bidding above the amount of taxes due. Somewhat less than 2 years thereafter the State had acquired not quite 20,000 acres. Four years later the amount exceeded 500,000 acres. Including lands in process of acquisition, it is now more than 1,600,000 acres.

From the outset the management of these lands under forestry principles for timber production was one of the primary objectives. Although the law has never required that the chief of the department be a trained forester, and although not until 1920 was the incumbent actually a trained forester, the department has had remarkable stability and continuity of policy. The incumbencies of Dr. Rothrock and his immediate successor, Robert F. Conklin, who had been with the department from the inauguration of its work, covered together a period of 25 years.

Nevertheless, it would be unsafe to say that the Pennsylvania Forestry Department (now the Pennsylvania Forest Service of the Department of Forests and Waters) has been wholly divorced from political influences, or that its stability can be regarded as too well established to make the danger of an overthrow or disintegration of the enterprise wholly negligible. There is only one State in the entire country in which the head of the forestry work is given by law the protection of a civil service standing, and only six in which the lower officers are given this protection. Pennsylvania provides neither. The successful management of valuable public resources requires competent direction, continuity, loyalty, and all the other requirements for the successful conduct of a private business. Until the States which have considerable forest properties recognize this and set up adequate safeguards against political pressure upon or use of the organization engaged in managing the properties, the forestry enterprises are exposed to unfortunate and unnecessary risks.

While in New York the chief impelling motive that gave shape to its forest policy was the desire to save the Adirondack region from despoliation and private appropriation in order to keep it as a great public recreation area, in Pennsylvania the chief motive was to restore to productivity a large aggregate area which had been so laid waste by destructive lumbering and fire that it came to be spoken of as the Pennsylvania desert. As a rule the lands were obtained at low prices during the early years, even when they were not acquired through tax sales, because they were regarded as practically worthless. To bring back a valuable forest growth in a reasonable time forest management under sound silvicultural practices was essential. In 1903 the State Forest Academy was established at Mont Alto to train youths of the State for its forest service. It was made the Pennsylvania State Forest School in 1923. Most of the administrative force are graduates of this school. Thus a competent body of technically trained forest officers has been provided. The State derived a gross income from the forests in 1931 of \$42,268, of which \$4,933 came from the sale of forest products, harvested under sound methods of utilization. In addition 9,000 cords of wood were taken from the forests under free-use permits. Rentals and leases, mainly of sites for summer homes and private camps, furnished the chief source of revenue, bringing in \$27,677. Given security against the undermining effect on morale and the menace of instability and lowered standards created by the possibility that the organization may be utilized for political ends, the Pennsylvania Forest Service can be confidently expected to make the State forests steadily more valuable and of greater usefulness. Of all the States, Pennsylvania has achieved most in putting into effect actual forest management and reclaiming to economic productiveness through State acquisition and administration extensive areas of depleted and degenerated forest and idle cut-over land.

Yet after 35 years of continuous upbuilding of the State's forest policy, aided by a remarkably strong public approval and by steady support from virtually all the governors during the period, and although in per capita wealth and consequent capacity to engage in public undertakings for the general welfare the State ranks high, its program is far from its goal. An adequate meeting of its forest problem has not yet been provided for. How much longer it will take for the State to add to its present holdings the additional acreage which should be acquired and put under public management will doubtless depend largely on the exigencies and accidents that in the main govern the rate of progress in such matters.

THE FIRST STEPS IN ORGANIZED FIRE PROTECTION

The first step toward State systems of forest protection against fire was taken in 1885. Laws to curb fires by establishing civil liabilities and imposing penalties for malicious, willful, or negligent causing of fires had begun in early colonial days, and had continued progressively. In the main, the basic purpose of these laws was the protection of property values, public or private, against destruction or damage, by giving the owner right of redress through legal action or by prescribing punishment for incendiaries and those failing to use due care. To some extent, however, even these laws expressed recogni-

tion of a public interest involved, beyond the mere protection of property rights and prevention of property loss—the thought that forests were affected with a public interest. It was also seen that, merely from the standpoint of safeguarding property, something more was needed than laws to restrain from injurious acts or to fix responsibility for damages. Collective action to extinguish dangerous fires required to be provided for, supplementary to what the individual property owner or the individual citizen might choose or be able to do of his own initiative. From this need sprang the beginnings of the fire warden system.

It reaches back into the period when the functions of government relating to the daily activities and community interests of the citizenry were highly localized. Town and county officers, close to the people by whom they were chosen to run the public business, performed most of the executive and administrative duties which it fell to government to take care of. It was quite in accord with the spirit and method of the time that, when a public need was discovered for some organized provision for fire control, State legislation assigned this new duty to specified local officers and clothed them with the necessary authority. Thus, in 1788, New York imposed upon justices of the peace, town supervisors, highway commissioners, and militia officers the duty of extinguishing forest fires, with power to summon residents to assist under penalty of fine for failure to respond. Under the colonial laws of New York anyone discovering fire might summon assistance and anyone who failed or delayed to help was subject to a fine. Another New York colonial law provided for the election of firemen, similarly empowered, in certain towns.

An opening was cleared for a great advance when the Colorado and New York laws of 1885 introduced the principle of a centralized direction and supervision of the local warden force. In Colorado, and in New York outside the counties in which lay the State lands, the authority of the forestry commission was too shadowy under the 1885 laws to have any material effect. The most that the commission could do was to make suggestions, endeavor to arouse interest and an increased sense of responsibility, and ask for reports. If local officers chose to ignore the commission (and many did), the matter ended right there. The Colorado law merely said that the district and county forest officers “shall be subordinate to the Forest Commissioner of the State”. That this law was very nearly a dead letter from the outset has already been said. The New York law occupied a much more important place in the history of forest-fire legislation and administration—so important a place, indeed, that it calls for consideration in some detail.

Dr. Bernhard E. Fernow, Chief of the Division of Forestry in the United States Department of Agriculture, 1886–98, claimed authorship of the New York forest-fire law. At the time of its enactment Dr. Fernow was secretary of the American Forestry Association. Writing in 1898, he said:

The States of Maine, New Hampshire, Pennsylvania, Wisconsin, and Minnesota followed, with some modifications, this example of New York.

Directly under the Commission was a chief fire warden. Territorially, three forms of organization were set up. In counties which contained no wild or forest lands belonging to the State, the town

supervisors were ex officio fire wardens, with authority to divide their towns into districts and appoint district wardens and with the duty of taking whatever measures might be necessary to extinguish fire. But with respect to the Commission the only relationship imposed upon them by law was a yearly report on all fires covering more than 1 acre, showing the size, damage, cause if ascertainable, and measures employed and found most effectual in stopping the fire. Supervisors of towns in which were wild or forest lands of the State not included within the 14 forest preserve counties were to be the protectors of these lands, subject to instructions of the Commission; and when so ordered by the Commission they were required to appoint one or more forest guards, whose powers, duties, and pay were to be determined by the Commission. On the other hand, in the 14 forest preserve counties the fire wardens were to be appointed specifically as such, by the Commission itself, and were to serve during the pleasure of the Commission.

As an efficient agency for holding fires in check, a local warden system without centralized authority of supervision and control compares with an up-to-date, trained, disciplined, and properly equipped protective organization very much as a sheriff's posse would compare with a Regular Army detachment for resisting a military raid. Fire control has become in the United States during the last 30 years a specialized branch of forestry in which, perhaps, greater progress has been made from the standpoint of developing the best technique than in any other branch. The fatal weakness, of course, in the initial form of State organization for fire control was its extreme decentralization, with its certainty of inefficiency, changing personnel, varying degree of interest and capacity, and entire lack of cohesion and discipline. And, of necessity, the town and county officers upon whom these laws imposed, irrespective of their fitness or interest, the duty of serving as fire wardens were either themselves local politicians or indebted to local politicians for their offices. So poorly was the first form of State protective organization contrived.

A great advance was made when, after a number of years, the principle began to be established that the head of the State forestry department must be a trained forester with adequate professional qualifications, freedom from political control, and full power to select and dismiss the local wardens. A half-way step toward this centralization of authority was the provision made in the fire laws of a number of States whereby local wardens were appointed by town or county officers, subject to the approval of the State Forester with power vested in the latter to remove or obtain the removal of unsatisfactory men. But the development of really efficient State systems of forest protection did not take place until the Federal Government had worked out, on the national forests, practices and methods which the States could take over and adapt to their needs; and the period of real progress in the development of efficient State administration of fire protection was ushered in by the enactment of the Weeks law, in 1911, providing for Federal cooperation and financial aid to the States.

SUMMARY OF PROGRESS IN STATE FORESTRY ACTIVITIES DOWN TO PASSAGE OF THE WEEKS LAW

The progress made by the States between 1885 and the beginning of 1911 in organizing their forestry activities is partly indicated by the legislation of the period, which is summarized below. The summary

is not complete, and in some details is probably inaccurate, since full information on the subject has never been brought together; but it serves to give a birdseye view of the general movement. After 1890, laws designed to encourage timber growing through bounties or special taxation provisions are not included, since the subject of forest taxation is somewhat apart from the present matter of concern—namely, the development of State forestry activities as an organized governmental administrative function.

1885. California State Board of Forestry created; to gather and diffuse information, conduct experiments in tree planting, and aid in enforcing all forestry laws.
 Dakota Territory offered a bounty for the planting and cultivating of forest trees.
 New York State Forest Commission created; to administer the forest preserve, administer and supervise fire protection, and promote forest preservation and extension throughout the State.
 Nebraska provided by law for the observance of Arbor Day.
 Colorado created office of forest commissioner to have the care of the State's woodlands and promote forestry; county commissioners and district road overseers made forest officers subordinate to the forest commissioner in matters pertaining to woodlands; counties might expend their own funds locally up to \$100.
 Ohio State Forestry Bureau created, with investigative, advisory, and educational duties.
1886. Utah Territory provided an exemption from taxation for lands planted to forest trees for timber purposes.
1887. Kansas created office of commissioner of forestry; to set up two forest experiment stations and promote interest in forestry.
 Pennsylvania created a temporary commission of inquiry.
1889. New Hampshire created a temporary commission to inquire into the feasibility of State purchases of mountain timberlands.
1890. Wyoming offered a bounty for the planting and cultivating of forest trees.
 North Dakota law to encourage forest planting through tax exemption.
 South Dakota law to encourage forest planting through bounty.
1891. North Dakota created office of State superintendent of irrigation and forestry, to diffuse information and promote tree culture.
 North Carolina law required State geological survey to undertake study of timber resources.
 Maine State land commissioner made ex-officio forest commissioner; charged with certain educational and informational duties, but principally with administration of forest-fire protection under warden system; selectmen to act as wardens in organized towns, with appointive special wardens for unorganized towns.
1893. New Hampshire created permanent unsalaried forestry commission with paid secretary, mainly as an agency of inquiry and education but with authority to purchase lands for park purposes with any donated funds.
 Selectmen made fire wardens.
 Pennsylvania created a second commission of inquiry, of two salaried members.
1894. New Jersey required State geologist to gather information on forest lands owned by the State and the desirability of holding them, and on watershed conditions, forest influences, and the forest laws of other States.
 Minnesota required investigation of State's forest resources by its geological survey.
1895. Wisconsin made chief clerk of State land office State fire warden ex-officio, and town supervisors and road superintendents town wardens under supervision of the State warden, with authority to the latter to make and publish regulations for protection of the forests of the State. Costs of fighting fires to be borne by the towns, with \$100 limit.
 Minnesota made State auditor forest commissioner with authority to appoint a chief fire warden. Duties included fire prevention and suppression, and forestry investigation and education. Town supervisors wardens ex-officio; other wardens might be appointed where needed. Wardens empowered to call out residents for fire fighting.

1895. Pennsylvania created a State department of agriculture with a commissioner of forestry included in it. Duties of department included the promotion of forestry, through gathering and publishing forestry information and giving practical advice; the making and carrying out of rules and regulations for the enforcement of all laws designed to protect forests; and administration of all State forest lands.
- Utah State constitution included the same provision regarding the forests upon State and public domain lands as that in Colorado. (See p. 23.)
1896. Utah law passed directing the State land commissioners to reserve from sale such timberlands as they deemed necessary to preserve the forests, maintain stream-flow, and aid irrigation, and prohibiting purchasers of timber on State lands from using, injuring, or destroying trees less than 8 inches in diameter, except of certain species.
- Alabama code required investigation of the State's forest resources by its geological survey.
1897. Colorado abolished the office of forest commissioner and created a department of forestry, game, and fish.
- Wisconsin authorized the State fire warden to appoint a fire warden in each organized town, with power to summon aid, created a temporary commission to devise plans for administration, by a forestry department, of lands of the State suitable for timber production, and required investigation of the State's forest resources by its geological survey.
- Pennsylvania authorized purchases at tax sales, by the commissioner of forestry, of wild lands desirable for forestry reservations; and also created a commission to locate and acquire, with power of eminent domain, three forestry reservations of 40,000 acres each, on the watersheds of the Delaware, Susquehanna, and Ohio Rivers, respectively.
- Pennsylvania made constables ex-officio fire wardens, and prescribed their duties.
- West Virginia law passed requiring investigation of the State's forest resources by its geological survey.
- North Dakota law established the North Dakota School of Forestry to give instruction regarding forestry science.
1899. Minnesota provided for State forest reserves and created a forestry board of nine, representing diversified interests, to manage reserves and publish forestry information.
- Pennsylvania authorized the purchase of wild lands directly from the owners, at not more than \$5 per acre.
- Oregon provided for a State game and forest warden, with requirement that all game officials should act as fire wardens.
- Missouri law required investigation of the State's forest resources by its geological survey.
1901. Connecticut law provided for a State forester, responsible to and appointed by the State agricultural experiment station board of control. Duties mainly investigative, informatory, and advisory; but limited land purchases by the forester for State forests appropriated for and their administration authorized.
- Indiana created a State board of forestry, to be representative of various interests, with investigative, informatory, and advisory duties, including recommendations for State forest reserves.
- Pennsylvania placed its forestry work in charge of a separate department of forestry and made the commissioner of forestry the president and executive officer of a State forestry reservation commission, to which was given authority to purchase lands for and to manage and control reservations.
1903. Indiana authorized the purchase of 2,000 acres by the State board of forestry for forest nursery and demonstration purposes.
- Michigan made the State land commissioner forest commissioner ex-officio, with supreme authority in all matters relating to the preservation of the forests and the suppression of forest fires. Commissioner to appoint a deputy, known as the chief fire warden, who was given general charge of all forest fire activities in the State.
- Wisconsin established a department of forestry headed by a board of five commissioners, with authority to appoint a superintendent of State forests, who should act as secretary of the board and also be ex-officio forest warden, with the duty of enforcing the State law regarding the prevention and extinguishment of forest and marsh fires.

1903. Washington made land commissioner ex-officio State fire warden. County commissioners to constitute boards of deputy fire wardens and appoint local wardens as necessary. Other wardens and patrolmen included all State land cruisers as patrolmen at large. County warden boards in timber counties to establish closed seasons necessitating burning permits. Costs of patrol and fire fighting to fall on counties. Deputy wardens required to patrol their districts, post warnings, and enforce the law.
1904. Louisiana created a department of forestry under the commissioner of the State land office as ex-officio commissioner of forestry, with additional salary, and four unsalaried members. Department to make inquiries, report on them, and recommend legislation. All State activities for forest preservation placed under control of commissioner, with power to appoint a chief fire warden. An officer in each jury ward of the State required to act as local fire warden under direction of chief fire warden, with duty of preventing and suppressing forest fires.
- Massachusetts authorized the creation of the office of State forester, appointee required to have a technical education, who was to establish and maintain a forest-tree nursery at the Massachusetts Agricultural College.
- Vermont required that the governor designate one member of the board of agriculture as forestry commissioner, with special duties in the administration of the provisions of the act and the protection of forests from fire.
1905. California created a board of forestry consisting of the governor, secretary of state, attorney general, and State forester; the latter was charged with the administration of the State parks, the fire protective work throughout the State, and general forest publicity work. The State forester to establish districts and appoint citizens as voluntary fire wardens, who might be paid by counties or private persons or corporations. At dangerous periods the forester might maintain a patrol at the expense of a county. Counties were required to clear inflammable material from roads at the request of the State forester.
- Connecticut reorganized the forest fire protection system of the State, made the State forester ex officio State forest fire warden, and vested in him the authority, with the cooperation of town selectmen, to select district fire wardens. Each town was required to pay one half the cost of fire fighting within its boundaries, and the county and State one fourth each.
- Idaho in an act regarding the sale of timber from State lands and the prevention of forest fires charged the State board of land commissioners with the duty of seeing that certain restrictions were complied with, and that brush was properly cared for when timber was cut and sold.
- Illinois authorized the organization of forest preserve districts, each comprising a portion or all of one or more counties, and gave the board of commissioners of such incorporated district very extensive powers of taxation and general administration. Displaced by law of June 16, 1909, which was declared unconstitutional December 21, 1911.
- Indiana law regarding the burning of the woods required each township road supervisor to employ the assistance necessary to extinguish any fire within his district, the wages of the persons thus employed to be paid from the regular township funds.
- New Jersey established a State board of forest park reservation commissioners consisting of five members; given control of State forest reserves, with authority to adopt measures of encouragement to the practice of forestry by private owners.
- North Carolina enacted a new and more comprehensive law authorizing the State geologist to employ such experts and assistants as should be deemed necessary by himself and a geological board; a State forester was employed.
- Oregon made provision for the appointment of a forest fire ranger in each county of the State, to be paid by the property owners requesting such appointment. Law repealed in 1907.
- Tennessee created a department of game, fish, and forestry. Nonsalaried State warden appointed by the governor, who might employ a secretary, without expense to the State, said secretary appointing county wardens and special wardens, who were given the rights, powers, and authority of county sheriffs as to the enforcement of the State laws for the protection of the game, birds, fish, and forests of the State.

1905. Washington created a State board of forest commissioners and provided for the appointment of a State fire warden and forester who should have charge of all fire protection work. The law included exceptionally detailed regulations as to fire patrol and control.
- Wisconsin repealed much of the 1903 law and created a board of forestry, authorized to appoint a technically trained man as State forester, who would have supervision of all forest reserves and serve as State fire warden, with authority to appoint and remove one or more fire wardens in every town where he considered such appointment necessary.
1906. Iowa provided for an exemption of forest areas from taxation, and that the secretary of the State horticultural society act as State forestry commissioner, without additional salary, in promoting the objects of the law and in obtaining general reports upon forestry from nonsalaried county deputies, whom he was authorized to appoint.
- Kentucky created a State board of agriculture, forestry, and immigration, consisting of nine members, and authorized a small sum to be expended either directly or through the United States Forest Service in advancing the forest interests of the State. Repealed in 1912.
- Maryland established a State board of forestry of 7 members, consisting of the governor, 2 other State officials, 2 educators, a practical lumberman, and a citizen interested in forestry; to employ a technically trained State forester who should have charge of all forestry interests in the State, and head a State system of forest fire protection with the cost of fire fighting to be borne by the counties. Board empowered to accept gifts of land to the State for forestry purposes, and to purchase lands, with limitation as to price.
- New Jersey repealed previous forest-fire laws and authorized the State forest park reservation commission to appoint a State fire warden, who was given general supervision of all forest fire protection, and to require the appointment of town fire wardens with appointment by the commissioner if the town failed to act. The entire cost of fire control on State reservations and one-half of that on other lands of any town was made payable by the State.
- Ohio established a department of forestry at the State agricultural experiment station and abolished the old State forestry bureau. Cooperation with the United States was authorized, the State expenditure not to exceed the Federal.
- Rhode Island authorized the appointment of a commissioner of forestry.
- Vermont appropriated money for the establishment and maintenance of a forestry nursery.
1907. Alabama established an unsalaried commission of forestry comprising the governor, three other State officials, a member of the Federal Forest Service, a resident professor of forestry, and a practical lumberman, to gather and publish information as to the forest interests of the State and to recommend legislation. An optional system of county forest wardens to control forest fires was provided for.
- Idaho. The law of 1905 was superseded by one which required the State board of land commissioners to divide the State into fire districts and appoint wardens upon the request of timber owners.
- Kansas provided for the appointment of two forestry commissioners to reside at and have exclusive charge of the two State forestry experiment stations at Dodge City and Ogallah, each charged with the duty of disseminating knowledge about trees.
- Massachusetts forest protection act required that the persons appointed as town and city forest wardens be approved by and make reports to the State forester, and authorized the payment from State funds for the services rendered by such wardens under the direction of the forester.
- Michigan abolished the office of chief fire warden; duties devolved upon newly designated official, State game, fish, and forestry warden.
- Oregon created an unsalaried State board of forestry, with seven members; authorized to appoint fire wardens, who were to have the powers of peace officers as to arrests. The board was given no administrative duties other than those connected with forest fire protection, and a very limited annual appropriation.
- Pennsylvania enacted very strict provisions against the setting of fires on forest land, and appropriated \$500,000 for the purchase of State forest reserves.

1907. Tennessee provided for the protection of public and private lands from timber trespass and from forest fires.
- Texas provided for a game, fish, and oyster commissioner, the commissioner and his deputies to act as fire commissioners and to prevent and extinguish forest, marsh, and prairie fires.
- Wisconsin appropriated money for the acquisition of additional forest lands at tax sales and from counties that had acquired land under tax deeds. Another law authorized an exemption from taxation of lands planted with forest trees. The State forester was charged with important administrative duties.
1908. Louisiana created a commission for the conservation of natural resources, with membership of seven.
- Massachusetts authorized State forester, with consent of the governor and council, to acquire lands by purchase for purposes of demonstration in forest management; appropriation made.
- Vermont State Board of Agriculture abolished and a board of agriculture and forestry created, to consist of the governor, the director of the State agricultural experiment station, and two appointive members. Required to appoint a professionally trained forester, who was to act as State fire warden, have charge of the State reserves and forest nurseries, and conduct experimental and educational work.
1909. Delaware created a State board of forestry, to consist of the governor and four other unsalaried members. The forester of Delaware College made ex officio a member of the board and also State forester, with general supervision of all forest interests of the State, direction of the activities of all forest wardens, and authority to prevent and extinguish fires. Forest wardens to be appointed by the governor and receive compensation for special services performed under the direction of the State forester. Counties were authorized to raise money for forest protection, improvement, and management, and were required to pay the full cost of fire control. All fines and penalties were available for general forestry purposes.
- Idaho by amendments to the forest fire law imposed upon the State board of land commissioners additional duties as to informing the public regarding the fire laws, requiring a proper disposal of slash upon cutting areas, and cooperating with private owners in fire protection. Also provided that the State should pay its proportion of the cost of protecting timber in any district according to the extent of the timberland owned by the State in such district, in the same manner as other owners.
- Kansas repealed act of 1907, and a division of forestry established at the Kansas State Agricultural College. Board of regents authorized to appoint a State forester, to have direction of all forest experimental and educational work, with the duty of assisting towns, counties, corporations, and individuals in the planting, protection, and management of timber tracts.
- Maine forestry district was created as an administrative district for forest protection purposes, the forest commissioner was charged with special responsibility as to fire control therein, and a special tax was levied on all property within the district, to be used solely for protection expenses.
- Michigan created public domain commission of six members. All jurisdiction over State forest affairs formerly vested in the State forestry commission and the State land commissioner transferred to the new commission; State game, fish, and forest warden to perform his duties under its direction.
- Minnesota again revised the forest fire law so that the State auditor was to appoint a forestry commissioner who should be a member of the forestry board and have supervision of all fire wardens. Many amendments affecting various phases of forest fire laws.
- Montana made the register of State lands, the State land agent, and the State foresters a forestry board with the duty of managing the forests of the State on forestry principles, and provided for the appointment of a trained forester who should have general control of the timberlands of the State, including fire protection, under the direction of the State board of land commissioners. County commissioners were authorized to provide money for forest protection, improvement, and management.

1909. New Hampshire established a nonsalaried forestry commission of three persons, and appointed a forester, who was also the chief fire warden, with the duty of appointing as local fire wardens men nominated by selectmen; forester was charged with the execution of all forest work of the State, including the direction of all activities having in view the prevention and control of forest fires. Forestry commission authorized to buy land for forestry purposes whenever any person or persons should furnish the funds therefor.
- North Dakota created the office of forest fire warden. For unorganized townships having at least 25 percent of woodland, the board of county commissioners was required to appoint two or more wardens for each township and to designate the district of each. In each civil township in the State having at least 25 percent of its total area in woodland the supervisor was to act as forest fire warden.
- Pennsylvania authorized the department of forestry to grow and distribute young trees to all persons who would plant and care for them, charge not to exceed cost of production and transportation; repealed the act requiring constables to act as fire wardens; and provided for a force of forest fire wardens distinct from the peace officers. Commissioner and deputy commissioner of forestry were made solely responsible for the forest fire protection work of the State, and authorized to appoint a district fire warden in each borough and township.
- Rhode Island required the annual appointment of a forest fire warden by each town council, and the appointment of two or more district wardens if the town contained over 4,000 acres of woodland. Wardens required to take active measures to prevent and suppress forest fires.
- West Virginia provided for the appointment of a forest, fish, and game warden, for a term of 4 years; to be ex officio fire warden for the State; all deputy wardens made fire wardens for their respective counties. Cost of extinguishing any fire made recoverable by the warden, in the name of the county, from the person or corporation responsible for it; such recovery not to act as a bar to the recovery of civil damages by anyone injured.
- Wisconsin enacted specific regulations concerning forest fires and their causes.
1910. Louisiana authorized change of name of "Commission for the Conservation of Natural Resources" to "Conservation Commission"; membership increased to eight. Act of 1904 amended so as to designate the register of the State land office as forester, and to provide for a deputy forester who should have had technical training in silviculture. Among many new duties imposed on the forester and his assistant were general duties as to fire protection, cooperation with private parties, and authorization of the acceptance of gifts of land to the State for administration as forests by the State conservation commission. Commission authorized to purchase forest land for the State. Forest fire laws strengthened, with severe penalties.
- Maryland law of 1906 regarding the appointment and duties of forest wardens (appointed by the governor upon the request of the forester, with irregular pay) was amended; one warden provided for each 15,000 acres of woodland in any county, and State to pay one half the cost of fire fighting.
- Massachusetts authorized the acceptance of bequests and gifts for the advancement of the forestry interests of the State in the manner designated by the donor.

One of the striking things revealed by the legislative record is the large number of States which inaugurated activities in forestry in the years 1901-10. During the first decade of the twentieth century there was greater activity in the formation of State forestry departments which proved more lasting than in any other equal period. At the beginning of 1901, New York and Pennsylvania were the only States which had actually embarked on policies of permanent forest land ownership and administration. Not a single State had a technically trained State forester, nor were there until 1900 any technically trained foresters in the United States outside a very small number

who had obtained instruction in European schools. A number of States had so-called forest commissions or forest commissioners, and the beginnings of organized fire protection had come into existence through the setting up of State fire wardens, with a greater or less degree of authority; but these State officers, of varying designations, were in the nature of makeshifts without pretense of any special expertness qualifying them for their positions. There was a very considerable general interest in forestry, but very little knowledge of what it really meant, and almost no idea of how to proceed in order to get it on its feet as a State activity.

In the decade preceding the close of the century the most important forward impulse received by the forestry movement came from the effect on men's minds of the terrific forest fires of the period, particularly in the Lake States, where the losses both in property and human life were appalling. In the first decade of the twentieth century, on the other hand, there was developing a better public understanding of forestry and a wider and keener interest in obtaining its application. The oldest professional school of forestry in the country, Cornell, turned out its first graduate (a single one) in 1900, and the second oldest, the Yale School of Forestry, its first graduating class of eight men in 1902. Practically simultaneously with the creation of means of educating a supply of young foresters, the Federal activities in forestry began to expand and attract public attention. The preliminary stirrings which presaged the oncoming of the conservation movement were beginning to be felt. With the accession of Theodore Roosevelt to the Presidency came the real opportunity for a great burst of progress. The States were looking to Washington for ideas and guidance, and under the influence of what was happening at Washington, State forestry began to take shape in enduring and useful forms.

To this reliance upon outside leadership Pennsylvania was an exception. Like New York, its forestry movement, while gaining power from the stimulus of the general forestry movement, was essentially indigenous. The principal credit for it belongs to one man, Dr. J. T. Rothrock, who practically gave his life to it. Its most outstanding accomplishment has already been pointed out.

The States which turned to Washington for advice regarding the form of organization which they should set up to take care of their forestry interests received recommendations which embodied two principles as fundamental: (1) That their laws should provide for a technically trained State forester in charge of the work, and (2) that his position and entire organization must be nonpolitical. To assure an administration of the State forestry interests not dominated by political considerations, the States were advised to make their forestry departments independent of any existing department, such as departments of agriculture, land departments, and fish and game departments, and to make the State forester responsible to a directive board made up of representatives of organizations and institutions within the State of a kind to promise a capable and disinterested governing agency concerned solely with serving the public as well as possible.

An example is the board created by the Minnesota law of 1911. Following disastrous forest fires in the previous year, Minnesota then radically revised its forestry law. The chief executive officer was to

be "a State forester who shall be a trained forester." He was to be appointed and his work directed by a State forestry board of 9 members, of whom 1 was to be the director of the forestry school and 1 the dean of the Agricultural College of the University of Minnesota; 2 were to be appointed upon the recommendation of the regents of the university and 2 more upon the recommendation of the Minnesota Forestry Association; the other 3 were to be appointed upon the recommendation, respectively, of the State agricultural society, the State horticultural society, and the State game and fish commission.

Generally speaking, the State forestry departments which were created in the decade 1901-10 started off as principally agencies for gathering and disseminating information and performing an educational function with respect to forestry and its possibilities, partly through practical advice to landowners. State forestry had to feel out its way and make its own place. The State foresters were young men, their pay was small, and the interest of State legislatures in their undertaking slight. To obtain authority for its expansion and increased funds for its strengthening was slow and uphill work. Most politicians found little account in giving it backing, unless public demand made action expedient for them; and public opinion unless organized and led by men of determination and good judgment registered only spasmodically, if at all. There was little inclination anywhere, except in New York and Pennsylvania, to inaugurate policies looking to extensive undertakings of public forest ownership and administration. Nor was there in most States any strong desire to create a centralized, efficient system for the control of forest fires. The function of protecting privately owned forest property against fire, it was prevailingly thought, should fall to the owner rather than be undertaken at public expense; and to the extent that some means was needed for organizing and leading collective effort to control fires which threatened to spread widely, local wardens not tied in or at most only tenuously tied in to the State Forester's office were supposed sufficient.

There was one striking exception to this. In the Northwest, where yearly fires were doing great damage and enormous holdings of private timber were being built up, the unprecedented fires of 1902 accelerated a movement to obtain organized protection. In Washington and Oregon this movement at first took shape along much the same lines as in the East. The Oregon law of 1899, imposing on the State's game officials the duty of acting as forest fire wardens, and the Washington laws of 1903 and 1905 have been indicated above. In 1903 Governor Chamberlain vetoed, in Oregon, a law similar to that passed in Washington during that year, on the ground "that it called for a small appropriation." In 1905, however, Oregon passed a law requiring the county courts to appoint as fire rangers the persons named by one or more property owners desiring protection from fire. The cost of the rangers was paid by these property owners. This established the principle of fire protection maintained with the backing of public authority but at the cost of those desiring it.

Protection of his property by each individual timberland owner was both unnecessarily costly and of limited value, since fires paid no regard whatever to the invisible boundary lines between holdings. To provide for joint systems of protection, western timberland owners

devised the method of uniting for the maintenance of protective associations. The first timberland owners' protective association was formed in Idaho in 1906. The idea was quickly taken up in Washington and Oregon. These associations obtained funds for maintaining their several protective organizations by assessing their members, on an acreage basis. But there was no way to bring in owners who did not wish to share in the expense, although to protect the property of their members the associations were compelled also to protect intermingled or adjoining lands.

To meet this situation, the four northwestern States of Montana, Idaho, Washington, and Oregon eventually enacted laws which, while varying considerably in detail, embodied as their fundamental principle the requirement of contributions, in proportion to acreages, to support the protective organizations, from all the owners whose properties received the benefit. Where the State had land of its own to be protected, the State paid its share just like any other owner. Virtually, the associations became recognized agencies of the State for performing the protective function. They selected and employed the personnel of the organization, and managed it. Thus it came about that in the Northwest most of the cost of fire protection was met by the landowner, as such.

In developing their protective systems the associations were aided greatly by the progress in building up efficient systems of protection on the national forests dating from early in 1905, when the present Forest Service took charge of them. In place of the idea of wardens with the duty primarily of calling out forces of fire fighters and acting as leaders to bring the fire under control, came the idea of the ranger, with duties of patrol and functions of detection and prevention as well as of suppression. In place of the primitive, catch-as-catch-can fire fighting of the early days came the methodical development of procedure and organization that was to evolve into the modern highly specialized technique of large-scale operations in suppression. Not only were the protective associations assisted by being able to make use of methods developed by the Forest Service; where association lands were intermingled with or adjoined Government lands within the national forests, direct cooperation became possible, and mutually advantageous. Prior to 1911, the Northwest was the section of the country in which real progress was made in providing organized protection against fire as a State activity.

When the second decade of the century opened (that is, at the beginning of 1911), 25 States had forestry organizations of some kind, though in only a minor fraction of this number were trained foresters in charge. As a rule, the function of the State forester, where there was a trained man, was still mainly to give advice to forest owners, gather information on the forest resources of the State, their utilization, State timber requirements, and kindred matters, and carry on a campaign of general education concerning forestry. Except in New York and Pennsylvania, the financial provision for the work of the State forestry department was everywhere very meager and the organization for carrying on the work too small-scale to function in a really important way, beyond laying the foundations for more substantial activities as State forestry really found itself, in the next decade.

THE EFFECT OF THE WEEKS LAW ON STATE FORESTRY

On March 1, 1911, Congress passed the Weeks law. Section 2 of this law appropriated \$200,000 to enable the Secretary of Agriculture to enter into cooperative agreements with the States in order to protect from fire the forested watersheds of navigable streams. The cooperative agreements were to provide for the organization and maintenance of a system of fire protection organized in accordance with State laws, manned by State appointees, and supported financially by the State and the Federal Government jointly, on condition that the State should contribute not less than half the total cost.

Table 1 shows the growth of State fire protection under the Weeks law and the amendatory Clarke-McNary law of 1924, from 1911 down to the present time:

TABLE 1.—The growth of Federal-State cooperative forest fire protection, calendar years 1911-1931

Year	Number of States cooperating	Funds expended			Area under protection
		Federal	State	Private ¹	
					<i>Acres</i>
1911.....	11	\$36,692	\$165,975	\$54,590	60,779,000
1912.....	12	51,069	168,319	65,439	68,279,000
1913.....	17	67,414	356,144	246,761	82,678,000
1914.....	17	82,193	427,615	201,999	94,678,000
1915.....	20	69,134	487,795	329,548	98,388,000
1916.....	20	79,702	400,742	291,651	103,562,000
1917.....	21	82,733	537,272	659,052	104,062,000
1918.....	23	92,515	555,587	301,308	109,562,000
1919.....	24	85,706	718,555	1,366,749	128,812,000
1920.....	24	92,921	972,379	1,027,087	140,204,000
1921.....	25	265,522	1,494,831	876,826	165,801,000
1922.....	26	387,008	1,759,718	1,971,777	175,000,000
1923.....	26	325,549	1,759,207	1,454,094	(²)
1924.....	28	397,357	1,662,532	1,850,862	(²)
1925.....	29	414,829	1,815,094	1,204,583	178,200,000
1926.....	33	654,099	2,009,415	1,936,286	195,200,000
1927.....	34	704,748	2,005,522	1,368,992	202,100,000
1928.....	38	1,256,225	2,062,687	1,272,693	213,106,000
1929.....	38	1,208,988	2,804,818	1,982,426	223,973,000
1930.....	38	1,389,121	3,899,644	1,705,975	227,551,000
1931.....	³ 38	1,532,944	3,839,305	2,056,264	227,611,000

¹ Private expenditures previous to 1917 probably understated because complete data for earlier years are lacking.
² Data lacking.
³ Includes Territory of Hawaii.

The workings of the laws under which Federal cooperative aid has been extended to the States will be fully discussed in the chapter of this report entitled "Federal and State aid." For the purpose of the present section, all that is called for is a brief indication of the part that this law has played in shaping the development of State forestry, determining its set-up, crystallizing its program, and giving it its present capacity for further development and future usefulness.

The immediate effect of the Weeks law was to make the administration of fire protection a recognized field of activity for the State forestry departments generally. It gave them something specific to do, and the same thing to do everywhere. The whole trend of State forestry was given thereby a new direction. The influence exerted by the Weeks law was by no means due solely to the opportunity that it held out to obtain Federal money and the resulting stimulus

to enlarged State appropriations for fire protection. The law embodied a principle the validity of which many State legislatures had up to that time been hesitant to accept. Always, of course, any proposal for a State to enter upon a new form of public activity encounters the resistance of inertia and conservatism. Reluctance to set up a new form of demand upon the State treasury that will be bound to grow greater is not only understandable, but a course of prudence, unless the justification of the new undertaking is clearly seen. That the cost of protecting forest properties in private ownership against damage by fire should be borne in whole or in part by the public, because public values and public interests were involved in addition to the property interest of the private owner, was a principle which, following the passage of the Weeks law, rapidly gained general acceptance. Federal leadership in laying down the principle largely brought the change. Not only did the law cause the States which had forestry departments to assign them the function of administering organized fire protection; the attention of other States was attracted, and as the benefits and practicability of fire control became clearer many new States set up systems and created forestry departments primarily for this purpose. In consequence, outside of New York and Pennsylvania, where land administration had from the outset held a leading place in the State's forestry work, the administration of fire protection has been the backbone of State forestry.

Federal cooperation influenced and strengthened the State forestry departments, however, in other ways than by leading them into fire protection and helping finance it. The Federal cooperative funds were not in the nature of a subsidy to State enterprises of fire protection. They were made in recognition of definite national interests and purposes to be served, in addition to purely State interests. Therefore, the way in which the money was used was a matter of direct Federal concern. Failure on the part of a State organization to function efficiently would not only constitute a waste of funds supplied in part by the Federal Government, but also would mean a falling short in the attainment of the national objective of the law. The duty therefore devolved upon the Forest Service, as the agency charged with administration of the Weeks law on behalf of the Federal Government, to inspect the workings of the State systems and do its best to help bring them to as high a standard of efficiency as possible. The Forest Service was able to be of assistance to the States in their effort to build up good systems of fire protection principally in three ways.

As the agency charged with the duty of protecting the national forests, the Forest Service had been compelled to study intensively the whole fire problem and was making steady progress in the development of the technique of fire control. Its ability to serve as adviser was increased by the fact that, coming into contact with the work in all the cooperating States, it was able to bring to bear on each State the experience that was being gained elsewhere. It was also a means of strengthening the hands of the State foresters against political pressure to put or keep on the pay roll inefficient men.

THE PRESENT STATUS OF STATE FORESTRY ACTIVITIES

STATE ORGANIZATIONS

In 42 States there is now legal provision for carrying on forestry activities, and in most of them a distinct forestry organization is set up. In a few instances it is one of several divisions of the Conservation Department, in others it is subordinate to some other State administrative board, commission, or commissioner, and in still others it is independent of other State activities but subject to some control by an appointed board or commission. Experience has demonstrated that a set-up which involves the field force of the State forestry organization in such other activities as the enforcement of the game and fish laws tends to react against its success in its own particular field of forestry. This set-up is most likely to be attempted when the State forestry department is one of the divisions of the Conservation Department. Further than that, under this form of organization, the development of the forestry work may be and sometimes has been hampered by a lack of sufficient interest in it or understanding of it on the part of the Conservation Department head or heads, chosen primarily to administer other activities.

A forestry board or commission which serves in a directive capacity, formulates policies, sets up a program, and strives for means to accomplish it, but does not concern itself with or interfere with the choice of personnel other than that of State forester, is a very workable form of State forestry organization. It bears the same relation to the State forestry enterprise that a board of directors does to a successful business enterprise. A board of this type appointed by the Governor with terms of office the same as his own, however, is likely not to serve the best interests of forestry. A board whose personnel is entirely or largely fixed by law may be good, but it is not ideal; ex-officio members of boards may be too busy with other affairs to take an active part, or may not be particularly interested in forestry. But with conditions as they are in politics in some States today, it is probably best, if not essential, to make the composition of the board definite. Preferably, the board members should serve for staggered terms so arranged that any one administration cannot preponderantly alter its composition, and should choose their own chairman. Some States have such boards today. This board structure conduces to the choice of strong and interested men, and assures continuity of policy. While the board may have some political tinge, this can be a source of strength to the forestry cause rather than a weakness.

Table 2 indicates how State foresters are appointed. Only in New York must the selection be in accordance with a State civil service law. The State foresters however are as a rule selected on a basis of fitness, and retained as long as they remain effective and their relations with their boards of superiors continue harmonious. They are ordinarily subject to removal for administrative reasons, as would be true in any efficient business organization. Nevertheless, the removal from office of State foresters on political grounds has sometimes taken place, and is a real danger to the maintenance of the work on a high level of efficiency. State civil-service protection to the year-long staff other than the State forester is provided in California, Maryland, Massachusetts, New Jersey, New York, and Wisconsin.

TABLE 2.—*Characteristics and composition of State forest organizations, 1932*¹

Region and State	State forester										Composition of organizations					
	Pro- vided for	Appointed by—			Requirements		Tenure of office		Relation to other State organizations				Year-long		Part time	Total
		Gov- ernor	Other official ²	Board ³	Tech- nical training	Civ- il service rating	Inde- ter- mi- nate ⁴	Term Years	Inde- pend- ent	Subordinate to—			Tech- nical	Non- tech- nical		
										Con- serva- tion Com- mis- sioner	Board of For- estry	Board of Con- serva- tion				
United States total.....								Years					Number 327	Number 1, 310	Number 25, 659	Number 27, 296
New England:																
Connecticut.....	X		X	X		X	X	4	X		X		6	15	802	823
Maine.....	X								X				13	4	874	891
Massachusetts.....	X					X	X	3	X				9	96	2, 709	2, 814
New Hampshire.....	X		X						X				4	10	832	846
Rhode Island.....	X		X			X	X				X		1	2	164	167
Vermont.....	X					X		2			X		8	2	318	328
Total.....													41	129	5, 699	5, 869
Middle Atlantic:																
Delaware.....	X		X	X		X	X				X		1	2	40	43
Maryland.....	X	X				X	X					X	7	7	700	714
New Jersey.....	X		X			X	X		X				18	79	365	462
New York.....	X		X		X	X	X		X				57	265	2, 652	2, 974
Pennsylvania.....	X	X						4	X				61	170	4, 000	4, 231
Total.....													144	523	7, 757	8, 424

¹ Exclusive of Arizona, Nevada, New Mexico, Utah, and Wyoming in the Southern Rocky Mountain region in which States no State forester or similar officer has been provided by law.

² Usually a director or commissioner.

³ Includes commissions of several types.

⁴ Includes officers held during good behavior, during satisfactory service, and those held during the pleasure of appointing boards or other groups.

TABLE 2.—*Characteristics and composition of State forest organizations, 1932—Continued*

Region and State	State forester										Other year-long personnel with civil-service rating	Composition of organizations				
	Appointed by—			Requirements		Tenure of office		Relation to other State organizations				Year-long	Part time	Total		
	Pro- vided for	Board		Tech- nical training	Civil- service rating	Inde- ter- mi- nate	Term of office	Inde- pend- ent	Subordinate to—							
		Gov- ernor	Other official						Con- ser- vation Com- mis- sioner	Board of Con- serva- tion					Com- mis- sioner of Agri- culture	Other board
South:							Years					Number	Number	Number	Number	
Alabama	X											5	58	68		
Arkansas	X											0	0	(5)		
Florida	X											11	14	18		
Georgia	X											12	11	39		
Louisiana	X						4					1	298	0		
Mississippi	X						4					4	6	15		
North Carolina	X											7	52	25		
Oklahoma	X											4	11	39		
South Carolina	X											6	1	7		
Texas	X											6	13	255		
Virginia	X											11	5	1,416		
Total												67	416	5,767	6,250	
Central:																
Illinois	X						2					2	7	10	19	
Indiana	X											6	4	2	12	
Iowa	X						2					0	0	0	(6)	
Kansas	X											1	1	0	2	
Kentucky	X						4					3	9	23		
Missouri	X						2					0	0	0	(7)	
Nebraska	X											0	1	81		
Ohio	X											11	29	625	665	
Tennessee	X											7	2	4,000	4,009	
West Virginia	X											3	6	890	899	
Total												33	59	5,538	5,630	

[illegible]

⁵ Arkansas has provided no funds to fill the office.

⁶ Secretary of the Department of Agriculture is the State forestry commissioner, inactive.

7 No funds, 1932.

⁸ Forestry work under the direction of the director of the conservation and survey division of the University of Nebraska.

⁹ Office of State forester is filled by the president of the School of Forestry, at Botineau. Not counted in this tabulation.

¹⁰ Chief and assistant chief of division do not have civil-service standing.

Strength is given to the organization in 18 States by the legal provision that the State forester shall be a technical forester; in 24 States there is no such requirement. The provision for a technical forester is most striking in the southeastern group of States; it is noticeable by its absence in five of the six New England States. Although the laws of 24 States do not provide for technical foresters, the present incumbents in 11 of those States, Indiana, Michigan, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Oklahoma, Pennsylvania, Vermont, and Wisconsin, are technical men.

Salaries of State foresters and their staffs conform pretty much to State standards. For State foresters they vary from \$1,800 to \$8,000, with a majority running from \$3,000 to \$5,000. In lower administrative positions the salaries range from \$1,200 to \$3,000; some exceed the last figure. In many States they are inadequate to hold men of the caliber needed to meet the higher responsibilities or to attract technically trained men to the arduous but less responsible positions and retain them until they can be advanced. In these States the salary scales must be readjusted if the brains, experience, and stability essential to successful functioning of the organization are to be looked for.

That the State forestry departments are attempting to build up their organizations with technical men is indicated by the number employed, 327 in all. Pennsylvania leads, with 61, and is followed by New York, with 57. The preponderance of such men in these two States is to be expected, because they have acquired and are administering large areas of forest lands; technical men are essential to the successful development of forest lands.

The number of part-time men employed is of significance in one respect. They are usually fire wardens who function only during the forest fire season. The number of such wardens is partly indicative of State-wide interest in the control of forest fires and partly of large areas of forest land in need of protection. The outstanding States in this respect are Pennsylvania, North Carolina, Tennessee, Massachusetts, New York, and Virginia.

Nearly all the State organizations begin with a mere skeleton force in State employ. County or town officers have commonly been previously charged with the duty of suppressing forest fires by State law or local custom. At the outset, the State forester has in some cases been expected to rely on these local officers with the skeleton force under him engaged mainly in assisting or nominally supervising their efforts. Such a form of organization is highly unsatisfactory. When the State forester either appoints the county or town forest-fire officers or has the authority to disapprove and reject such men if unsatisfactory, the organization is strengthened tremendously. Even under this arrangement, however, elements of weakness are likely to show up with serious if not tragic consequences in periods of extreme forest-fire hazard and forest-fire occurrence. This leads to a gradual assumption by the States of the entire responsibility and often the entire burden of forest-fire protection. It is a normal trend in the interest of efficiency, and will be accentuated as time goes on.

The State organizations as a whole have able men at their heads; their field force, when not subject to political control, is as competent for its job as can be expected, sometimes more so, when the

salaries paid and the meager number of men employed are considered. Fire protection has been the principal job, and with experience the men have become proficient in it.

Administration and development of State forests has been given secondary consideration. It is the more difficult job of the two, because it requires men with technical training and a longer time to learn. It demands more intensive study, careful observations, and closer supervision than it has had in the past. It is going to necessitate greater emphasis on State effort in this direction, and even realignment of personnel in some State organizations, if the job is to be coped with successfully.

Due to lack of appropriations, some State organizations are, of course, woefully undermanned. A limited number are just about built up to the point in quantity and ability of personnel to handle the State's forestry problems in a satisfactory manner, and it can be expected they will do so. More will arrive at that situation in a few years. For others, where favorable public sentiment toward forestry is not as yet well developed, and where the State's wealth is disproportionately small, the outlook is not so cheerful. A long period of intensive educational effort is indicated, during which a careful and thorough administration of the type of work that can be undertaken must be the primary aim.

As a rule, the laws authorize the State forestry organization or its administrative officers to carry on a wide range of forestry activities, such as to maintain a system of fire protection, to assist the private owners of woodland, to ascertain facts about and make reports on the State's forest resources, to cooperate with the Federal Government, to grow and distribute forest trees for planting, and to acquire forest land through one means or another and administer it as State forests. In a few instances, certain activities such as purchase of land for State forests and the growing and distribution of trees to private owners are not permitted. The extent to which the States engage in these various activities and the degree of success attained is largely determined by the State funds appropriated for the various purposes.

The general trend in State organization is to divide the States into districts and to put a man in charge of each. With aid, supervision, and inspection from headquarters, these men handle most of the various State activities in their districts, especially protection, reforestation, and management of State lands. Some States have gone further than others in decentralizing these activities and in delegating authority to the district men. Educational activities and legal matters are ordinarily handled by or are under close supervision of the central office, and of course policies and programs are decided there. Extension activities are logically a function of the district men and are handled by them when they are technically qualified for the task. Otherwise, this field is covered by the headquarters organization.

THE PROMOTION OF PRIVATE FORESTRY

The chief purpose of most State policies of forestry is to bring about private timber growing. Policies of extensive permanent forest ownership and management by the States are still exceptional. While forest protection, forest research, nursery production of planting stock, and public education in forestry are all necessary for successful public forest management, and while in the States that are engaging

in forest management these activities serve both purposes, it will not do violence to the general situation to regard them as conducted primarily to promote private forestry.

Initially, many of the State forestry organizations were created as agencies for gathering and diffusing information that would acquaint forest owners and the public generally with the methods of, the need for, and the returns obtainable from forestry. This was particularly true prior to the passage of the Weeks Law in 1911, which offered Federal cooperation in maintaining organized protection against forest fires. Following the pattern set up for them by the Bureau of Forestry in Washington before it was placed in charge of the national forests, the State foresters undertook to gather information on the forest resources and forest industries of their several States, the requirements and markets for the various classes of forest products, the damage done by forest fires, rates of growth, desirable practices of forestry, and the like.

Since the science and art of silviculture as applied to American conditions had hardly begun to be built up, they had to learn as they went along. Partly as a means of gaining experience, partly as a means of diffusing knowledge of the principles of forestry, they commonly offered to give private owners advice on the care of their woodlands. In this also they were influenced by the example of the Federal Bureau of Forestry. Above all, they had to quicken public sentiment into vigorous life against uncontrolled forest fires. Thus functions of research (if the early unsystematized fact gathering may be so termed), of public education, and of extension either preceded or developed along with the assumption of administrative responsibilities. This was true particularly in the East.

EDUCATION AND EXTENSION

Public education in forestry is still and will continue to be an important function of a State forestry organization. An intelligent public opinion based on widely diffused knowledge of the objectives and methods of forestry is essential for the best use of the forest resources. The story of what forestry is and of its aims and public welfare aspects must be told over and over. The scope of the State work, what and where its current activities are, what more it might do, the problems confronting it, how the public can help, desirable legislation, and regulatory provisions of the forestry laws are all subjects of real public interest. In proportion to the degree that the purposes served by a State forestry organization are of public benefit, public support will be accorded if the facts are generally known. The rate of progress in State forestry is largely dependent upon how successfully the State forester can take on a function of leadership. Educational activities are of vital importance in meeting the problems of State forestry.

Numerous means are open. The State forester must use many avenues of approach if all classes of the public are to be informed. There are great differences in the amount of attention given to educational activities by State organizations. In part this is because some have more resources to work with, either in money or in the form of better speakers and writers in their organization. In part it is because of a better appreciation of the value of educational effort.

The most important single means of popular education in forestry matters is without doubt the press. The daily and weekly newspapers reach people in all walks of life. In some States prepared news bulletins are furnished for the newspapers of the State.

State foresters are often given an opportunity to speak over the radio. Some radio stations also broadcast the so-called fire weather reports, warning the public when the weather for the day will be very dry and conducive to forest fires. Public addresses by State forestry officers are among their duties, and are widely used as a means of education. Frequently the speaker can use lantern slides or moving pictures, of which some States own their own films. New York State in 1931 had films covering 30 different titles. There is such a wide call for addresses of this kind that it has been necessary in New York to restrict addresses to audiences where there will be at least 200 people.

In their every-day personal contacts with the public, the State forestry employees are constantly performing an educational function. Observers on the fire lookout stations are often provided with postal cards and other printed matter, to hand interested visitors. Some States require their field men to wear a uniform, which calls attention to the work and the fact that the State is engaged in it.

In several States special efforts are made to reach boys and girls in summer camps, children in the schools, and people not easily reached through ordinary channels. Several of the Southern States in cooperation with the American Forestry Association put on a special 3-year educational campaign among the country people who lived in the wooded sections. Trucks which carried their own moving-picture equipment and lecturers were employed for that purpose. Pennsylvania as long ago as 1926 had enlisted in an organization known as the Forest Guides of Pennsylvania 25,000 boys, who were pledged to help protect the forests of the State and to urge others to do so.

Exhibits at fairs are a common means used to arouse interest, both through the exhibit itself and through the man in attendance. These exhibits take many and ingenious forms. The posting of signs and the publication and distribution of bulletins afford means of reaching large numbers of people. Pennsylvania in one 2-year period distributed more than 400,000 copies of publications, covering many phases of forestry work.

Demonstration methods are beginning to be used, with good results. Several States have set up roadside demonstration plots, conspicuously signed. Pennsylvania and Connecticut lay out "blue-ribbon plots." The trees most suitable for the final crop trees are selected and marked with a band of blue paint. Trees which if left would interfere with the growth of the final crop trees will be cut out as they can be marketed. These plots have excited a great deal of curiosity; signs are placed to indicate their purpose and they have thus become of educational value.

The laws of Georgia, Louisiana, Mississippi, North Carolina, and Tennessee require the teaching of forestry by the regular staff of teachers in the primary or advanced public schools or in both. In Ohio, South Carolina, and West Virginia provision is made by law for the State board of education in each case to prepare a course of study in fire prevention, which presumably includes protection of forests from fire. This course is for use in public, private, and paro-

chial schools of the State. Tennessee led in requiring that forestry must be included in the public-school curriculum. Its legislation on this subject dates back to 1921. It was closely followed by Louisiana in 1922.

State colleges or universities with courses leading to a degree in forestry are found in California, Colorado, Connecticut, Georgia, Idaho, Indiana, Iowa, Louisiana, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, North Carolina, Oregon, Pennsylvania, Utah, and Washington. In New York, Pennsylvania, and Washington, State institutions provide courses of instruction for forest rangers.

Elementary courses in forestry are provided by universities and colleges in Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Georgia, Idaho, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, New Hampshire, New York, North Carolina, North Dakota, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Utah, Vermont, Virginia, Washington, and Wisconsin.

Forestry extension is another type of State activity. By forestry extension is meant those activities directed toward assisting the private owner in handling his forest land. Of necessity the State forester is obliged to give time to this activity, even if it is only by correspondence and the preparation and distribution of publications, because he is certain to be called upon for this kind of service. There is no measure of the time and effort which forestry extension entails, but in the aggregate it is very considerable. It is a popular type of service, and it is the means of inaugurating forest management in wooded areas here and there throughout the State. If it could be developed to the utmost of its possibilities, it would constitute perhaps the greatest service that could be rendered to private timberland owners. At the present time in most States dual organizations are handling it, and for the most part too restrictedly. The first is the State forestry organization; the second is the extension service of the State agricultural colleges. The latter is limited to farm forestry extension. The State forestry organizations for the most part have not been built up to the point in number of men where they are able to meet the demands for help. The State extension services are weak also in the number of foresters employed (one forester ordinarily has to cover the whole State) and too frequently the work is hampered by a lack of training and experience in forestry on the part of the county agents upon whose shoulders lies the major burden of agricultural extension work. They are capable men, but extremely busy with many other agricultural subjects. Hitherto, in their conception of a county agent's job, attention to timber as a farm crop has been likely not to find as much of a place as it merits.

In a number of States there has been a definite effort by the State foresters to foster the extension work. In Maryland at least it is a major State forestry activity. Maryland has long made a specialty of assisting private woodland owners. General examinations and recommendations for handling private forest tracts are made entirely without cost to the landowner. If an estimate of the timber and its value is requested, if a sample marking is made, or if a contract of sale is prepared and the owner furnished with a list of probable buyers for his product, a charge for the forester's services is made of

\$3 a day plus his expenses up to three days; thereafter \$8 a day is charged for his services. The \$3 is about half of the actual cost to the State, but the work is regarded as a forest demonstration in which the State is glad to share the cost. During the year 1929 examinations were made and recommendations formulated for 50 pieces of woodland, comprising nearly 13,500 acres; these were scattered in 18 counties. During the same year more intensive service was given on 6 operations covering 143 acres located in 4 counties.

The 1929 report of the State forester of Maryland speaks of this work as follows:

Numerous examples are on record where individual owners have been benefited, according to their own estimates, to the amount of thousands of dollars by the service given at a nominal cost.

This statement can unquestionably be accepted at full value. Twenty-four of the States make these field examinations. From 1920 through 1925 (later data are not available) the Pennsylvania State forestry organization examined 1,939 tracts, aggregating 386,749 acres. From Virginia comes the statement that the demand for this type of work has been too great to meet with the present personnel.

Without doubt that is the situation in a great many States. It will be remedied as State appropriations increase and State-wide organizations are completed. Pennsylvania today, through its wide-flung State organization, is probably better equipped than any other State to handle this activity effectively. The organization in New York State is rapidly being built up to the point where it can do so. It seems that it will be only a question of time until all States which are actively engaging in forestry will have built up a State force under which district foresters will have charge of all State activities, each within a certain described region. When that situation comes about forestry extension will undoubtedly be one of the important jobs of each district forester.

Within their prescribed field, the State extension foresters, who are supervised by the directors of extension at the State colleges of agriculture, are carrying on forestry extension as well as their small numbers and funds permit. Some have shown exceptional ability. Their activities are limited to the farm woodland owner. Under the present set-up at least they are not expected to assist other timberland owners. The activity of these men is made possible by Federal funds, and they are given some Federal supervision. This phase of extension is described under the section Federal Financial and Other Direct Aid to the States. The Federal aid to the States for extension work under the terms of the Smith-Lever, Capper-Ketcham, and Clarke-McNary laws and direct Federal appropriations for extension work amounts to over \$10,000,000 annually. Of this amount only \$70,000 is allotted for farm forestry extension. State funds for the same purpose total about \$90,000.

Considering that the forest area in the United States is substantially greater than the area in cultivated crops, and that the production of forest crops is a matter about which most people know very little, these appropriations are in striking contrast. There is a decided lack of balance when, as in the Upper Peninsula of Michigan, although only 5 percent of the land is in cultivated farm crops, almost the entire extension effort has to do with these crops. Forestry extension is still operating on a shoestring, and is therefore entirely unable to take

its rightful place in the general scheme of agricultural extension. There is a further weakness in the fact that forestry extension specialists receive most of their supervision, advice, and direction from men not intimately familiar with forest practices and forestry aims. Being attached to a service which has little primary contact with the forest problem, the extension forester is often detached from the general current of forest ideas. An additional difficulty is that most of his work is done through county agricultural agents, 4-H Club leaders, and to some extent home demonstration agents, whose time is too fully occupied with other projects to leave room for much attention to forestry unless their interest in it is rather exceptional. Few county agents have had the kind of training necessary to give them a balanced land use attitude or a practical understanding of the methods of forestry. The State colleges might well give more care to seeing to it that those preparing for county agent work in the naturally forested regions receive specific preparation for farm forestry work. In Louisiana this is now required.

The forestry extension specialist is supposed to work in cooperation with the State forestry department and in many if not most cases he does so freely and fully, but the contact is usually not close enough to obviate the danger that two independent agencies will be engaged on the same forestry problem, with insufficient coordination of effort and advice. This danger should by all means be averted. It can be if the work of the forestry extension specialist in each State and the work of the State forestry department can be closely enough correlated.

The full field of forestry extension includes not only farm woodland owners but other timberland owners. An adequate extension set-up would require provision for reaching both effectively, under a unified plan. With such a set-up, Federal funds for forestry extension could well be increased in some proportion to the magnitude of the area and the problems confronting the forest owner.

RESEARCH

When it began to appear, as the nineteenth century wore along, that the country would be faced with a forest problem of large proportions, the need for better knowledge of our forests, forest resources, and forest requirements was borne in upon most of those who gave the subject any attention at all. This was the more natural because the forestry movement of the latter half of the nineteenth century was greatly influenced by scientific thought, was largely led by scientific men, and was promoted by scientific organizations.

DEVELOPMENT AND FUNCTIONS OF FOREST RESEARCH

The most outstanding fact in the early situation was that no one knew what ought to and could be done. That the forests of the country were being destroyed, that the current practices of utilization must somehow be altered, that timber growing must be brought about to provide for future requirements, and that some form of public action was needed were matters concerning which intelligent opinion tended to coincide. But when it came to practical remedies, everything was involved in uncertainties.

There was not even an approach to knowledge of the amount of standing timber in the United States, the rate at which it was being

cut, the drain through fire and through natural causes such as disease and insect attacks, and the rate at which the supply was being replenished through growth. There was no basis for a conclusion as to what the future needs of the country for wood and other forest products would be. The whole subject of forest influences upon climate, water supplies, the regimen of streams, the navigability of rivers and harbors, the rate and character of erosion, and the relationships between the forest and wild life of various kinds was practically unexplored. Popular opinion on some of these matters was pretty well formulated, in a broad way, but was based wholly on unverified generalizations derived from common observation or on European thought.

Future forests and forest products supplies were supposed to depend largely on tree planting, commonly called "forest culture" and considered to be akin to horticulture; but many and difficult technical problems had to be worked out before artificial reforestation on a large scale could be successfully undertaken. Regarding the art and science of silviculture as applied to the management of established forests ignorance was abysmal. Even the make-up of the American forests—the relative representation of tree species, the complete list of the native trees, the character of the undergrowth, and the relative representation of age classes—was very imperfectly known. Similarly, what the wood of these species was good for and how to use to best advantage the many kinds of wood at hand were matters that had never been made a subject of careful inquiry; men were satisfied to take the cream, wastefully, and to use it wastefully, governed chiefly by the ease and cheapness with which it could be obtained, handled, and worked, and by its general high quality.

Hence the form of public action to which those solicitous over the forest problem of the country naturally turned first was the building up of better knowledge. One of the subjects of inquiry, it was seen, should be the economic aspects of the problem—how much timber there was in the country, and where; how fast it was being used up, and for what purposes; whether a future shortage must be looked for, and if so, how soon; timber exports and imports; and so on. Another subject of inquiry was the forest itself as a biological and geophysical entity; the natural laws governing its distribution and behavior, and its influences. A third concerned methods of use and the cultural practices necessary to perpetuate the forest as a resource or to provide new forests. It was to serve these purposes that Congress first made provision for the conduct of investigations by the United States Department of Agriculture; and it was chiefly for these purposes that the States inaugurated their early work in forestry. In other words, public forestry at the outset was primarily in the field of what, with some qualifications, may be called research.

Research is a term often loosely used nowadays to denote almost any fact-gathering activity, however trivial and even mechanical its character and however practical its object. Research is of course the pursuit of new knowledge. Whether its ultimate object is utilitarian or to obtain new knowledge as an end in itself, increase of knowledge is its immediate goal. Man has been accumulating knowledge through observation and experience during the whole period of human history, as a by product, so to speak, of his struggle to live and better his condition; but research builds up knowledge in a different way.

Scientific research ordinarily implies a methodized procedure and uses as its most effective tool rigorously controlled experiment. Forest research is now organized and systematized; and some would draw a line of demarcation between what is fully entitled to be called forest research because it employs the method of controlled experiment and what is merely the accumulation of knowledge through observation of what goes on in the ordinary sequence of uncontrolled natural events.

Historically, such a distinction does not fit. Forest research of the present day has been built up from the early observational study of the American forest—of its composition, behavior, relationships, services, and possible products and of the effects upon it of cultural methods or of lumbering, grazing, fire, and other forms of human or natural interference—together with inquiries, chiefly of a statistical character, relating to forest economics, and with the beginnings of laboratory experimental work on wood as a material.

In the initiation of these investigations and the opening up of the field for forest research the States took an active part. An example is the work carried on in Ohio for a few years by the forestry department created in 1885 and centering at the State university. Still more striking is the investigative program formulated and pursued for a time by the California Forestry Department dating from the same year; this included the setting up of two forest experiment stations—the first ever started in the United States. Kansas set up two experimental tree-planting stations. A number of States assigned to their geological surveys investigations of their forest resources. The work of botanists connected with State institutions also calls for recognition. And when, after the turn of the century, State foresters began to be appointed, their task was to a considerable extent investigational. Indeed, in those days every cutting or planting operation carried out in accordance with a forester's prescription partook of the nature of an experiment; and the chief means by which a basis was created for American silviculture was woods observation by the first generation of trained foresters.

While the investigational quality, and indeed purpose, of the first applications of technical forestry by both Federal and State foresters justify classing much of this early work as forest research in a broad sense, time has wrought a great change. Silvicultural practices, it must be admitted, still often lack a firm basis of certainty as to what will be the outcome of this or that course, and management policies must too much grope their way, with opportunism taking the place of long-range planning; but the professional forester engaged in managing a forest property is essentially a practitioner, not an explorer of the unknown. On the other hand, forest research has become organized and implemented for careful, systematic work; its pioneer stage has been left behind. It is under the necessity of covering a field of enormous range and complexity, demanding the work of specialists in many different fields of scientific knowledge. It has turned away in the main from broad, superficial investigations yielding immediately serviceable approximations, to engage in much narrower but deeper studies designed to obtain precise information on details. This is true even though the advance in this direction has been less than would be desirable. There remains too large an unfilled need for approximate information, and the resources available

in trained men and money are still too small, to permit attention to the more fundamental matters proportionate to their importance.

PRESENT SCOPE OF FOREST RESEARCH

The breadth and diversity of the whole field, as now covered with very varying degrees of intensiveness, may be briefly indicated. To facilitate the growing of commercial timber crops, research seeks the information basic to all silvicultural practices. This includes methods of cutting the mature stands so as to insure satisfactory reproduction of the kinds of trees wanted for the next crop; forest planting; determination of the rates of growth of stands; and methods of weeding and thinning immature stands to produce the most rapid growth and the best products. The behavior, effects, and statistics of forest fires are studied to obtain a better basis for devising protective measures. For the same purpose investigations of forest insects and diseases are carried on.

In the field of forest products utilization, research seeks new uses for wood, extends present uses to other species, and by deep-going study of the physical, chemical, and mechanical structure of wood gains fundamental knowledge for application in all kinds of wood processing, adaptation, and manufacture. The life and food habits of forest animals and birds are studied to learn how the best balance of game and other wild life in the forest may be maintained. The knowledge necessary for the best use of forest ranges in proper coordination with the use of the timber and other resources is sought through range investigations. Forest influences present an important field of inquiry. In economics, information indispensable to the progress of forestry in all fields is gained on such diverse matters as the extent and character of the country's forest resources, the ratio between forest depletion and rate of growth, our probable future timber requirements, the trends in forest products utilization, the taxation of timberlands, timber insurance, and the financial aspects of timberland management. These are the major divisions of forest research. They are commonly referred to as forest management, range management, forest protection against fire, forest entomology, forest pathology, forest biology, forest influences, forest products utilization, and forest economics.

RESPECTIVE FIELDS OF THE FEDERAL GOVERNMENT AND THE STATES

The organization of forest research along comprehensive lines, permitting a methodical attack in force on the forest problem as a whole, has taken place only in very recent years. This form of attack makes desirable a coordination of all available research agencies. The Federal Government is doing far more in forest research than any other single agency—a natural result of the fact that it is much the largest owner of forest land in the country and is applying forest management more extensively than all other owners put together; not to mention other reasons for Federal forest research. This position carries with it at once an opportunity and an obligation to plan for and endeavor to bring about coordination.

The Federal coordinating function is not new. To provide centralized leadership of the early forestry movement was the outstanding

function of the Federal Division of Forestry in its days of small beginnings. In those days the share taken by the States was relatively large, partly through the cooperation of botanists attached to State institutions of learning. With the rapid growth of Federal forestry after the turn of the century, however, the tendency was for a time to leave to the Federal Forest Service the research necessary for building up the practice of forestry. This trend was strengthened by the demands made upon the State organizations and funds as they entered upon administrative activities of organized fire protection and in some cases of forest land management. On the other hand, as schools of forestry were established new potential agencies for forest research in the States were created. In the aggregate, the organizations and institutions which can participate in a correlated program make up a rather imposing list. Obviously, the greater the number of agencies the more desirable becomes coordination, with each agency taking the kind of work that it is best fitted to engage in.

The following summary of forest research projects active in 1930 in New England and New York illustrates how State and Federal agencies may coordinate their work with each other and with that of private organizations. (Table 3.)

TABLE 3.—*Distribution of research projects carried on in New England and New York in 1932, among the several agencies conducting them*

Agency responsible	Number of projects by character of work								Per- cent by agen- cies
	Forest man- age- ment, men- sura- tion, den- drology, and ecology	Forest- ation (seed stud- ies, nur- sery, and plant- ing)	Forest protec- tion	Forest prod- ucts and utili- zation	Forest eco- nomics	Fish and game	Recrea- tion	Total	
Forest schools.....	68	24	4	7	-----	4	-----	107	37
Agricultural colleges and ex- periment stations.....	17	2	6	2	1	-----	-----	28	10
Other colleges and universities.....	9	1	11	3	-----	-----	-----	24	9
State forestry departments.....	5	5	5	4	2	-----	-----	21	7
U.S. Forest Service.....	17	1	3	4	-----	-----	-----	25	9
U.S. Bureaus of Plant Indus- try and Entomology.....	-----	-----	12	-----	-----	-----	-----	12	4
Botanic gardens and scientific institutions.....	2	2	3	-----	-----	-----	-----	7	2
Associations and committees.....	-----	1	-----	-----	3	-----	2	6	2
Companies.....	29	15	7	1	-----	-----	-----	52	18
Individuals.....	6	-----	-----	-----	-----	-----	-----	6	2
Total.....	153	51	51	21	6	4	2	288	100
Percent by classes.....	53	18	18	7	2	1	1	100	-----

Of the 288 investigative projects, 37 percent were being conducted by the forest schools, 10 percent by agricultural colleges and experi- ment stations, 9 percent by other colleges and universities, and 7 percent by State forestry departments. Many of the investigations by the forest schools and presumably some also by other colleges and universities are privately endowed, so that the amount of strictly State-supported school research is obscured. Over 63 percent of the work by the forest schools is in forest management or closely related

subjects. The greater part of the investigations of the State forestry departments is nearly equally divided between forest management, nursery and planting, forest protection, and forest-products utilization. The research in forest economics, fish and game, and recreation is far below that in the other subjects, but newly awakened interest will probably demand increasing attention to these subjects in future.

The research activities of the State forestry departments at the present time are in the main the outgrowth of the requirements of their administrative work. The activities have been undertaken, as a rule, because of the need to find answers to concrete practical and localized problems. Most of the resulting projects have been small scale, limited in scope, and very specific in purpose. In many States these essentially ad hoc minor investigations have been about all that the funds available for the entire work of the departments make possible. Examples are investigations relating to forest-tree nursery and planting practices, the development and improvement of forest fire fighting equipment, fact-finding surveys of the wood-using industries, studies of forest growth, and studies of forest-tree insects and diseases. These are all of direct and important value to the organizations. The only State forestry department in which research has advanced far enough to attain what may be called a major status is that of Pennsylvania, though Maine gives major status to the study of forest insects.

As is pointed out in the section Research in the United States Forest Service, a Study in Objectives, a line of division of responsibility between State and Federal functions is recognized in the research objectives of the Federal Government. Federal research deals with national or regional problems, and with local problems only in so far as their solution is necessary to the proper administration of the National forests. The responsibility for research on forestry problems of primary importance to individual States should rest in the main, it is believed, with the States themselves, most of which by now have forestry departments and many of which have State-supported schools of forestry and other research agencies. On the other hand, it is necessary to take into account also what the States are equipped to do and likely to do.

Insofar as the State forestry departments are concerned, the scope and character of their research activities are bound to be governed by the nature of their jobs as well as by the extent of their resources. Where State forestry departments are charged with important responsibilities of forest land administration for timber growing, the need for silvicultural research to provide a sound basis for forest management must sooner or later come to the fore, as it has with the Federal Forest Service in connection with the administration of the National forests. Hitherto, however, only a few States have entered upon policies of forest ownership and management on a substantial scale. The effort has been mainly directed toward encouraging and aiding private forestry. Most of the work of fire protection—the major activity of the State organizations as a whole at the present time—has this as its objective. Similarly, most of the States which maintain forest tree nurseries to produce planting stock do so primarily to aid private owners in reforestation. Assistance to private owners through information and advice on forestry practices and methods is another duty of most of the State forestry departments, though in

considerably varying degree. Here, obviously, the results of silvicultural research are needed, and will be more and more needed as practices of forestry by private owners become intensive. The need of forest research for this purpose is of the same general kind as the need for agricultural research on behalf of agriculture.

Obviously, the outstanding immediate need of most States has been for more light on matters directly affecting their operations in connection with fire control and the production and planting of nursery stock. Planting methods are important not only in connection with planting operations on State forests, in those States having them, but also for guiding private owners to whom the State supplies the stock grown in its nurseries—if the field planting is a failure the work of the State in producing the stock has gone for naught. It has been to meet immediate needs of these kinds that most of the ad hoc minor investigative projects already referred to have been undertaken. But whether or not the States are likely in the near future to enlarge materially their administrative field through building up State forests (which there is reason to expect), it will be necessary to obtain in some way the basic knowledge required to advance the practice of forestry. This raises the question of the research facilities available, actually or potentially, for that part of the investigative work which will not be taken care of through the Federal agency.

STATE FOREST RESEARCH FACILITIES

Facilities for State forest research are afforded (1) by the State forestry departments, (2) by the universities and colleges in which technical forestry is taught, and (3) by State agricultural experiment stations.

Facilities of the State forestry departments.—State forestry departments vary greatly in age, available funds, and range of activities. Some are still in a preliminary stage of organization, struggling with inadequate resources to meet difficult and critical problems, of which the protection of the forests from the devastating effects of fire is sufficient, alone, to absorb much more than the meager funds granted them. Other States with older and more strongly developed departments have advanced further in research, the beneficial effects of which are becoming apparent. Pennsylvania and Michigan have gone so far as to establish forest research centers and experimental stations, while others have developed forest nursery research and test arboreta, or have made valuable contributions through the study of tree species or forest types within their boundaries.

The Pennsylvania Forest Research Institute at Mont Alto is outstanding as a forest research agency which is an integral part of the State forestry department and is provided as a part of its equipment for performing its practical duties. This institute was dedicated to forest research on June 5, 1930, to bring about the betterment of forest practices on all types of forest land in Pennsylvania. The studies to be undertaken cover a wide field and embrace both those termed fundamental and those classed as administrative. The staff of the institute is made up of five to seven technical men.

Somewhat similar in its field of work is the Cloquet Forest Research Station, located at Cloquet, Minn.; but this station is not maintained by the State forestry department but is a part of the Agricultural Experiment Station of the University of Minnesota. It was estab-

lished in 1909 and is devoted to a study of the problems of the northern Minnesota woods.

Another station worth noting is the Michigan Forest Fire Experiment Station at Roscommon, Mich. It was organized in 1930 and is a cooperative enterprise of the Michigan Department of Conservation and the Lake States Forest Experiment Station of the United States Forest Service. Both the State and the Federal Government are represented on the station staff, and the various investigations under way are divided between them by mutual agreement. As its name indicates, the station was established to make forest-fire investigations. This includes a variety of subjects such as fire weather studies, firebreak construction, fire damage, slash disposal, and the development of fire-fighting equipment.

The needs of the State forestry departments for more knowledge will call for an increase of research facilities such as these stations afford. The Pennsylvania Forest Research Institute is an example of what might easily be done by a number of the more wealthy States, at least, to enable their forestry departments to work out their more fundamental problems. On the other hand, the Minnesota station affords an example of an alternative course which a good many States will doubtless prefer to take. Instead of setting up special provisions for the conduct of major research projects, arrangements may be made to have the work of this kind assumed by the forest schools and agricultural experiment stations. Some States are now pursuing this course.

Research facilities at State forest schools.—A considerable amount of research in the aggregate is conducted by divisions, departments, and schools of forestry attached to the State universities or colleges of 19 States. The amount varies greatly. Most of the forest schools have faculties of from 2 to 4 professors only, who usually have little time for research. Hence the larger part is done by relatively few schools of forestry, at which special provision of one kind or another is made for the purpose. In general, the research which is done by the schools equipped for it is more intensive and less limited in point of applicability than that performed by the State forestry departments.

Not all of the forest schools, of course, are connected with the State-supported colleges and universities. Some of the privately endowed universities, notably Harvard, Yale, and Duke, occupy outstanding positions in the list of institutions equipped to share in the general forest research program, and need to be included without distinction from the State-supported institutions in appraising the available facilities for the work in the States.

Limitations upon the resources of the forest schools affect the amount rather than the kind of research. Their field is much broader than that of most of the State forestry departments—so broad that each school must select from it. The resulting diversity of programs is brought out in the section, Privately Supported and Quasi-public Forest Research. The schools have the opportunity, not generally possessed by the State departments, for doing research of an advanced and intensive character. Nor are they as limited as are the State departments to work relating to their own State.

The character and scope of this work has been a result partly of the recognized urgency for basic knowledge in forestry, partly of the affiliation of the forestry courses with other university departments

having definite research responsibilities, and partly of the opportunity and duty of the schools to turn out graduates especially trained for research, to recruit the personnel of the schools themselves and of other established forest research agencies. Accordingly various schools have adopted definite policies of research. At the University of California,³ for example, each member of the forest school staff is required to devote half of each college year to research, and during this period he is relieved of all teaching duties. Problems of the range, forest mensuration, logging, milling, forest influences, and silviculture have been the principal subjects of research. At the New York State College of Forestry the faculty members have been allotted liberal time for research, and especially significant work has been done in wood technology, wood chemistry, wood utilization (particularly as related to the problems of pulp and paper), forest entomology, and forest pathology. The school maintains an institute of research in wild life, the Roosevelt Wild Life Experiment Station. At a number of other schools—for example, Cornell, Idaho, Michigan, and Minnesota Universities, and Pennsylvania State College—research is expected of all staff members. At Cornell, Idaho, Pennsylvania State, and Purdue men are employed who give their full time to investigative activities. At the Iowa and Michigan State Colleges and the universities of New Hampshire, Utah, Montana, and Washington one or more instructors are devoting considerable time to research. Usually the research is done within the confines of the State, and hence is concerned to a considerable extent with problems important within the individual States, or with local aspects of general problems. Some of it, however, is on subjects broadly fundamental, the results of which are of high regional or even national value. Thus while the forest schools are a most effective research aid to the State forestry departments in advancing the sound management and utilization of the State forest resources, their efforts can be, and generally are, effectively coordinated with the Federal forest research system through the regional forest experiment stations and the Forest Products Laboratory.

FOREST RESEARCH BY STATE AGRICULTURAL EXPERIMENT STATIONS

Forest research by the State agricultural experiment stations, under the terms of the Hatch, Adams, and Purnell Acts, is interpreted as relating only to agricultural aspects of forestry. Since farm woods comprise about 25 percent of the entire forest area of the country (from 30 to 50 percent in the Southern, Middle Atlantic, and Central States) and since the value of products cut and sold from farm woods ranks high among all farm products in a number of States, a large field for forest research is presented for the agricultural experiment stations, and for cooperation between these stations and the forest schools, in the States having the latter. In the West the agricultural experiment stations are conducting a very considerable amount of research in the fields of range management, ecology, and economics which coordinates with or is closely related to the forest-range investigations of the Federal forest experiment stations. At least 26 States are carrying on some work that has to do with forestry or with the problems of range management.

³ Cf. *Forest Education*, by Henry S. Graves and Cedric H. Guise. Yale University Press. 1932. P. 288.

EXPENDITURES FOR STATE FOREST RESEARCH

Anything like an exact statement of the present expenditures for State forest research is impossible. In the section State Aid to Private Owners and Local Political Units an incomplete showing for the fiscal year 1932 reached a total of not quite \$176,000. This showing was based partly on specific data and partly on estimates. The latest statistics of annual expenditures by the State forestry departments—variously reported for the years 1931 and 1932—show an aggregate expense of \$97,855 for research. It seems not unreasonable to estimate the forest research expenditures of the forestry and other departments of State universities and agricultural colleges at \$165,000. This, of course, does not include the expenditures by privately endowed institutions, discussed in the section Privately Supported and Quasi-Public Forest Research.

The data presented in the section State Aid to Private Owners and Local Political Units showed only one expenditure by an agricultural experiment station, amounting to \$8,000. The listed projects of the stations, however, evidence a rather widespread activity in various lines of forest research. Collectively, the agricultural experiment stations appear to have spent on research projects in forestry about \$14,000 of Federal funds received under the provisions of the Hatch, Adams, and Purnell Laws. Including this \$14,000 the experiment stations probably devoted to research projects that fall within the field of forestry or correlate with Federal forestry investigations about \$55,000, exclusive of \$75,000 for range research in the West.

In addition the States contribute to various activities that involve research or relate closely to it. Expenditures totaling some \$50,500 in 1932 by the Pacific Coast and Lake States for economic survey work on forest land fall in this class. The amounts spent in the different sections of the United States are given in the section on State aid referred to above.

The aggregate expenditure by all State agencies is thus somewhere in the neighborhood of \$443,000, of which about \$14,000 is supplied by Federal grants.

Divided as these various classes of research expenditure are among many States, the sums are inconsequential and entirely disproportionate to the size and importance of the forest problems confronted in most cases. The funds allocated to research by the State forestry or conservation departments, including those for economic forest land surveys, amount to only about 2 percent of the aggregate appropriations to these departments.

CONCLUSIONS

State forest research should in the main complement that of the Federal Government though dealing primarily with problems of special importance to individual States. This is particularly true for the State forestry departments, few of which are equipped to engage in research on a major scale. Their investigations are at present limited for the most part to the solution of exigency problems arising in the course of other activities, but their needs will necessitate the provision of increased facilities, either of their own or provided by other State research agencies.

The forest schools of the State agricultural colleges and State universities are in a position to meet both State and Federal needs for

information obtained through research. Their field is divided between problems local to the States in which they are situated and problems of basic value to all branches of forestry, outside of as well as in the State.

In general, an opportunity for most effective cooperation in research is provided by the Federal forest experiment stations and Forest Products Laboratory, the State forestry departments, the State forest schools, and the State agricultural experiment stations, each within its own field coordinating systematically in the task of increasing the knowledge needed for forest management.

The systematic cooperation of these agencies and the Federal Government, coupled with the large amount of technical research which cannot be escaped by private industries, is essential if the expansive field presented to forest research is to be covered amply and economically. The Federal Government carries the responsibility for research on national and regional problems, and on local problems affecting national-forest administration. Many of the agricultural experiment stations have facilities for at least some classes of forest research.

The State forest schools carry the dual responsibility of aiding both the national and the State services. For the national service, in addition to supplying the trained personnel needed, they are in a position to increase very greatly, from local sources, the fund of knowledge made available by other research agencies, and especially to undertake research along lines not otherwise provided for. They can assist the State departments materially by concrete research on State problems for which the departments may not have time or facilities. In both respects the research function of the schools is unquestionable and outstanding. They should be a much stronger link in the chain of forest research activities than they now are.

The funds at present expended by the States on forest research are relatively meager. The proportion of their total allotments now spent by the State forest departments on research and forest land surveys (amounting to about 2 percent) should be greatly increased through additional appropriations to permit of an expansion of research activities. An average of 10 percent of the appropriations to the forestry departments of State universities and colleges might reasonably be expected to be devoted to research; and the increasing importance of farm woods justifies far greater research effort by the agricultural experiment stations than is now being given.

AID IN REFORESTATION

The outstanding facts with respect to State efforts in reforestation are brought out under the discussion of Federal Financial and Other Direct Aid to the States. Thirty-eight States, Puerto Rico, and Hawaii are now growing forest trees in their own nurseries or contracting to have them grown, selling a part of them to the public in accordance with their own State laws, and planting the remainder on their State forests. In these 38 States 76,631,000 forest trees, sufficient to plant from 75,000 to 80,000 acres of land, were grown for these purposes during the calendar year 1930.

The funds appropriated by the States for reforestation activities for the year 1932 total over \$1,000,000. The greatest development

in this activity occurs in the Middle Atlantic States, the Lake States, the New England States, and some parts of the Central States. In the regions where public interest in forestry is general private landowners have taken kindly to the idea of planting worn-out fields and pastures. Forest planting was one conception of forestry that they could readily grasp. Sentiment, more than economics, has been responsible for a big part of the planting by individual land owners. Water companies on the other hand have planted rather extensively for the protection of watersheds, and States and towns have freely planted on State forests and on town forests. A temporary peak in planting operations by private owners seems to have been reached. Stock from State nurseries is not moving to private owners quite so freely as formerly. The water company lands are pretty well planted up; farmers and other private landowners are affected by the depression.

Of all the States, New York has today the most ambitious reforestation program. It entails the buying over a period of years of 1 million acres of land for State forests, and the planting of such portion of that total as is not satisfactorily stocked with forest trees. Marginal and submarginal farm lands will make up the bulk of the area to be purchased under this program. Most of this will have to be reforested. Approximately 1 billion trees will need to be grown in the State nurseries during the next 10 or 11 years to meet the needs of the State alone in this reforestation program.

The other States will doubtless continue to produce enough trees in their nurseries to meet the public demand and to meet their own needs for planting on State forests. Available figures indicate that to the end of the year 1931, 271,811 acres of land had been planted by the States on State forests.

Insofar as the State organizations are concerned, they have developed the personnel and forest nursery facilities sufficient to take care of any probable demand for forest planting stock. They can easily expand their nurseries if necessary. Their policies are pretty much the same in respect to distribution of trees from State nurseries. Trees are sold at cost of production to the landowner, for forest planting only. Under their laws some States furnish political units such as towns, counties, and boroughs with free trees for planting in the community-owned forests. The States do not raise ornamental stock for distribution to the public.

Comprehensive efforts to stimulate State-wide programs of planting all land that appears better suited to forest production than other purposes have not been made. The nearest approach to it has been in Pennsylvania and New York. Both of these States have developed nurseries that have turned out millions of trees each year, which have either been sold to private landowners or planted on publicly owned lands. Still there has been no definite goal set up, no actual survey of the situation to find out how much land needed planting, nor a policy, comprehensive program, and means provided to bring these lands into forest productivity.

There is no exact knowledge of the amount of land that needs planting. Many areas which appear to need planting today may reclothe themselves with trees in 10 years. Areas which do not need it today may become hopelessly devastated by fire next year or the year following. There are, however, in some States vast areas of

land that by no stretch of the imagination will come back into forest growth without planting and which appear hopeless for any use in a large way except the production of timber. It seems that if such lands are to be made productive at all, if they are worth saving, the State must boldly take the initiative in their reclamation. This may be by liberally subsidizing the private owners or by acquiring and planting the lands itself. Michigan has been acquiring and planting such lands, but comparatively speaking only at a snail's pace; New York has resolutely decided to acquire and is engaged in the program of acquiring marginal and submarginal farm land, which is being planted. There are vast areas in the Southern States of cut-over and burned-over land that apparently will come back to productivity only if planted, and large areas of the same type of land are developing in some far western States. Will the States meet this problem—are they financially able to do so? It appears very doubtful.

The question naturally arises as to whether all such land should be planted, whether it will pay. No one can answer that question. Viewed in the light of present timber values and the probable growth of timber, it seems that planting cannot be justified on much of the poorer and relatively inaccessible lands if the first crop of timber only is considered. The mere clothing of these lands with trees, however, might have tremendous significance in the future. A resource would be there that if correctly managed could be made self-perpetuating and the means of sustaining local industries and communities. To pass up this undertaking on the ground that it is uneconomic is the easy way out of a real problem; it may not prove to be the best way.

There are possibilities of developments in nursery practice, in planting machinery, and in field technique that may make the planting job much cheaper than it has been. These would make the task ahead of the States much more simple; for after all the extent to which the States themselves are likely to engage in or subsidize forest planting is going to be governed by its cost.

AID THROUGH SPECIAL TAXATION MEASURES

The subject of forest taxation is too intricate to be dealt with comprehensively in the present section of this report. All that is necessary here is to indicate very briefly its place in the development and general scheme of State policies of forestry. While an appraisal of the potentialities of changed methods of taxing forest properties as a means of bringing about more private forestry is essential to a size-up of the task which public agencies will have to assume, and while taxation cannot be omitted from an outline of the stage of progress which the States have attained in their forestry effort, it is not possible to discuss in detail here the efficacy of tax laws as a means of promoting forestry or the practical workings and comparative merits of the various laws hitherto passed.

The following historical summary of the legislation is taken from Progress Report No. 16 of the Forest Taxation Inquiry of the Forest Service, issued January 1, 1932.

Forest tax legislation in the course of its development in America has passed through two fairly well-defined stages. At the outset tax relief was used as a means of interesting landowners in tree culture, evidently without any very clear program based on fundamental principles of forestry or of taxation. The movement at this stage started with a law passed by the territory of Nebraska

in 1861 granting exemption to landowners who would plant and care for stands of forest trees fulfilling certain conditions. Between then and 1886, similar laws were passed by nine other Prairie and Western States, namely, Wisconsin and Iowa (1868), Dakota, then a territory (1869), Idaho (1875), Washington and Wyoming (1877), Colorado (1881), New Mexico (1882), and Utah (1886). Before this wave of exemption laws had gotten well under way, Kansas started another movement of similar import by a law enacted in 1868 offering bounties for tree planting, which up to 1890 was followed by three of the States which had already enacted exemption laws and four others, namely, Missouri (1870), Minnesota (1871), Nevada (1873), Illinois (1874), Nebraska (1879), territory of Dakota (1885), and Wyoming (1890). Upon being admitted to statehood (1890) North Dakota and South Dakota reenacted the territorial law of 1885, and later enacted bounty laws, in 1905 and 1909 respectively.

Almost simultaneously with this western movement, the report goes on to point out, tax concessions to promote tree planting appeared in the East, beginning with Maine's exemption law of 1872.

By 1878 three other New England States, namely, Massachusetts, Connecticut, and Rhode Island had passed similar laws. Vermont later (1904) passed such a law, followed by Alabama (1907) and New York (1912). Pennsylvania (1887) and New Hampshire (1903) adopted the rebate, * * *. Massachusetts (1908) and New Hampshire (1915) granted exemption to those who would leave the entire management of their lands to the State for a period of years. Indiana (1899) adopted the plan of reducing the taxable valuation to the sum of \$1 an acre which plan was also adopted by Iowa (1906) and Louisiana (1910). Hawaii (1892 and 1903) enacted forest exemption laws which were designed to prevent overgrazing and protect the watersheds, and which have been widely applied.

In general, the exemption, bounty, and rebate laws gradually demonstrated their inability to accomplish any substantial results. At the same time knowledge of the broader aspects of forestry and its economic implications was increasing. Increasing attention was being given to the relation of taxation to the practice of forestry. Out of these conditions arose the second stage of forest tax legislation, in which the yield tax occupies the center of the picture. Beginning with the Michigan farm wood lot act in 1911, 17 States have enacted tax legislation based on the yield-tax principle, the others being New York (1912), Vermont, Connecticut, and Pennsylvania (1913), Massachusetts (1914), Maine (1921), Alabama (1923), Mississippi (1924),⁴ Ohio (1925), Louisiana and Kentucky (1926), Minnesota and Wisconsin (1927), Idaho and Oregon (1929), and Washington (1931). Michigan (in 1925) enacted a second yield tax law, which was applicable to commercial forests.

During this same period also much legislation of the same type as that passed in the earlier period was enacted. New York in the same year that it passed its yield tax law (1912) enacted provisions granting several degrees of exemption of land and timber value for 30 and 35 year periods. Idaho (1917) passed a tax-exemption law for planted lands. Louisiana (1920, 1922, and 1924) enacted a series of changes in its original exemption law culminating in a pronounced curtailment of the exemption privilege in 1922, followed by moderate liberalization in 1924. Indiana (1921) reenacted and amplified its exemption law of 1899, which in the meantime had been declared unconstitutional. New Hampshire (1923) copied the 1922 Massachusetts law almost verbatim, save that constitutional restrictions prevented the adoption of the yield tax as such. So, as an alternative, the timber when cut was made subject to the ordinary personal property tax of that year based on its value after felling instead of its stumpage value. This virtually converted the Massachusetts type of yield-tax law into a growing timber exemption law, with full ad valorem taxation of the bare land value. Vermont (1923), likewise dissatisfied with the way its yield-tax law was working, without repealing the old law, enacted a new law which provided for the exemption of growing timber and the full-value taxation of the land, thus duplicating in part the New Hampshire law, save that the exemption was limited to a period of 30 years. Puerto Rico (1925) enacted a law reducing the taxable valuation on planted lands to \$1 per acre for a limited period, but a later (1930) law provided for complete exemption for both planted and natural-growth forests for an unlimited period. California (1926) adopted a constitutional amendment exempting all immature forest trees from the property tax. Connecticut enacted

⁴ This law was repealed in 1932, subsequent to the issue of the report from which the quotation is taken.

an exemption law with certain novel features in 1929. Delaware (1931) provided exemption for a limited time for properties containing small trees.

In some of the more recent yield-tax laws, certain novel features have been introduced. Thus the Michigan law of 1925, the Minnesota and Wisconsin laws of 1927, and the Oregon law of 1929 give up entirely the ad valorem property tax on land and trees and substitute a specific tax at a flat rate per acre. Another novelty is a provision requiring a contribution from the State to the local subdivisions, in consideration of the loss of local revenue occasioned by modification of the property tax. Such provision is contained in the laws of Pennsylvania (1913), Michigan (1925), and Wisconsin (1927).

The constitutional amendment of California (1926) and the laws of Oregon (1929) and Washington (1931) represent an important innovation in forest-tax legislation, in that the classification of lands receiving special treatment is not dependent upon application by the owner. In Oregon and Washington the law requires the State administrative officials to take the initiative in bringing about classification. California goes still further toward universality by exempting from the property tax all immature forest trees without requiring action by either the owner or any public official to complete classification.

Recent legislation in Kentucky and Virginia (1930), which is designed to relieve the tax burden on forest property, is of an entirely different type from that mentioned heretofore. Both States provide for the leasing of private forest land to the State. In Kentucky the compensation to the owner is in the form of rental not to exceed the amount of annual taxes, and in Virginia the compensation is the deferment of the annual taxes for not longer than 40 years.

Many of the laws mentioned in the preceding paragraphs have been repealed and replaced by other forest-tax legislation of similar or of dissimilar type. The States of New Mexico, Utah, Kansas, Missouri, Nevada, and Nebraska have repealed the forest-tax legislation which has been mentioned here, and now these States have no special forest-tax laws on their statute books.

The progress report shows that up to July 1, 1931, a total of 1,370,791 acres was classified under the provisions of the laws discussed, distributed among 17 States, in the amounts which appear in the acreage column below:

State:	<i>Acreage</i>	State—Continued.	<i>Acreage</i>
Alabama.....	50, 494	New York.....	2, 902
Connecticut.....	6, 846	Ohio.....	36, 803
Idaho.....	53, 371	Oregon.....	256, 216
Indiana.....	60, 000	Pennsylvania.....	42, 186
Iowa.....	43, 105	Rhode Island.....	88
Louisiana.....	375, 292	Vermont.....	37, 472
Maine.....	20, 000	Wisconsin.....	278, 275
Massachusetts.....	25, 000		
Michigan.....	74, 285	Total.....	1, 370, 791
New Hampshire.....	8, 456		

State laws have apparently been the means of affording tax relief to about 1,400,000 acres of forest land, or less than three tenths of 1 percent of the total area of forest land in private ownership in the United States. How much land is now coming under these laws yearly is unknown. Except in Louisiana, Oregon, Washington, and Wisconsin the amount is probably small. In Oregon and Washington the law requires classification of lands of certain well-defined character by the State officials, unless the owner interposes objection. This will eventually bring a large acreage under the operation of the law, provided the land remains in private ownership. In Wisconsin a liberal interpretation of the law is inducing private owners to take advantage of it rather extensively.

AID THROUGH FOREST PROTECTION

PROTECTION AGAINST FIRE

Organized and successful protection of forests against fire is a *sine qua non* of timber growing and forest perpetuation. It is often essential for maintaining a timber cover of any kind; it is always and doubly essential to planned forest management. So long as the danger that forest fires will sweep unchecked across wide stretches of country looms large, permanent investments in timber production are almost sure to come to grief, at least for large landowners. Lack of protection, rather than lumbering, has created out of former timber lands most of our near hopelessly bankrupt no-man's land.

Lumbering may work havoc with the forest. It may leave the cut-over area in a condition from which its restoration to satisfactory productiveness will be too slow and costly a process to interest the private owner. By and large, however, the logging operations themselves do not so impair or destroy the fertility of the soil that the capacity to produce further crops of valuable timber is lost for many years. Nor do logging operations of themselves ordinarily lay the land bare of all forest growth.

Protection a means of lessening land abandonment.—Even where land seems to have been denuded, with protection some kind of a forest cover will as a rule gradually creep back. The return may be very slow, and the new stand may be of very inferior composition and quality, but from one source or another nature finds means to begin a regenerating process. Conversely, where repeated fires are allowed to run uncontrolled, a process of forest degeneration is at work even though the forest itself is left in place. The soil is impoverished, the vigor, rate of growth, and density of the stand are decreased, usually its composition is changed for the worse, and the quality of the timber is impaired. Adequate protection not only arrests the enlargement of the denuded area and permits the establishment on cutover lands of a new crop of timber but also gives many of the old burns a chance to regenerate gradually and stops the decline in quality and value of already established forests. This tends to keep the land in private ownership.

Very few States wish to enter on policies of extensive forest ownership and administration, if it can be avoided. Relatively few are prepared to meet the immediate costs. Whether or not State-operated enterprises of forest management will eventually become sources of net income, most States are not easily able to make the outlay necessary to acquire, block up, put under administration, and develop to an income-producing stage large tracts of lands now in private ownership; nor are they desirous of going into the business of timber growing unnecessarily. Outside of a small number of States in the Northeast, and another small number of western States which are holding large areas of granted forest lands, most policies of retention or acquisition have had in view primarily what may be called park uses—that is, provision of outdoor recreational opportunities, protection of wild life, and the safeguarding of scenic resources—rather than enterprises in growing and harvesting timber crops, except where the breakdown of private ownership is forcing forest land upon the public on a large scale.

It is at least highly probable that tax reversion would be still more widespread had not organized State systems of protection operated to hold in check forest deterioration and forest destruction, and thus give the private owner more incentive to hold on. A continued drift of forest land from private into compulsory public ownership is likely to include not only great areas of land virtually denuded of valuable timber growth but also much land on which the forest has degenerated to a point which makes holding it unprofitable. The more effectively forest fires are kept out, the smaller will be the dimensions of the problem of public forest management forced on the States; the more generally fires are allowed to degrade or remove the forest growth, the greater will be the amount of land abandoned and the public expenditures necessary to build up again to a productive condition the depleted resource.

Few people realize the magnitude of the scale on which forest degradation has taken place. To the uncritical observer the great amount of land still covered with tree growth is deceiving. The numerous and often large wooded tracts throughout the East seem to contradict the idea of waning forests. It is not the final disappearance of the forest but its transformation into a state in which the production of high-grade timber is no longer taking place, or is taking place only meagerly, that constitutes the major threat to the future.

Stopping forest fires will not of itself bring the process of forest degradation to an end—that can come only through skillful management in place of a mere wild-land holding with removal from time to time of what unaided nature happens to produce of economic value. Private owners will voluntarily take up forest management when, where, and if they find that it will afford them a greater profit than letting the forest take care of itself. Through the advancing exploitation of what is left of the virgin forests and the continuing depletion of the second-growth stands, the prospects for profitable timber growing are being steadily improved. On the other hand, through forest deterioration the possibilities are being markedly lessened. The greater the deterioration, the heavier will be the cost and the longer will be the wait before normal productivity can be built up again. It is to the interest of the States to hold back, so far as possible, the drift of unwanted forest land into public ownership through tax forfeiture if there is a reasonable hope that the private owner will in time put the land under management for timber growing. It is also to the interest of the State that, to whatever extent reversion does take place, the burden of restoring the land to a condition of productivity shall be as light as possible. Maintaining adequate systems of protection against forest fires serves both these ends.

In some regions adequate protection is of crucial importance as an encouragement to selective logging in place of clean cutting. An owner who would like to leave part of the merchantable stand for further growth and for seeding in the openings must have reasonable assurance that the residue of the crop will not be burned up before he will be ready to return for it 10, 20, or 30 years hence. Adequate protection also serves to stabilize recreational, wild life, and water resource values. From the standpoint both of private and of public values, its effect is tonic, with the benefit most pronounced where the

susceptibility of the forests to fire damage and the exposure to fires are greatest.

Protection the major activity of State forestry departments.—In a considerable number of States, forestry departments were first brought into existence to provide for organized systems of protection against forest fires. This is particularly true in the South and the far West. In some other States great fire disasters that caused terrible losses of property and life so aroused public sentiment as to cause very substantial increases of appropriations and authority. In nearly all States the maintenance of the protective system is the most outstanding form of forestry activity. The problems of protection are still for most States urgent, and in many cases will probably continue for years to demand major attention. While protection is not as yet generally adequate, it is the greatest accomplishment of State forestry. More constructive effort has been put into it and more money spent on it than on any other form of forest activity. It has demanded the services of both administrators and investigators. The development of its technique has been one of the most notable achievements of forestry in the United States.

While State forest protection has been immensely stimulated by the Federal aid offered under the Weeks law of 1911 and the Clarke-McNary law of 1924, progress in efficiency has not come about merely because there was more money to spend. It has been no less due to the ability and determination of the State forestry officers. A number have built up forest fire organizations that use practically all of the most up-to-date methods; others have made substantial progress even under very discouraging conditions.

Organization and methods.—Thirty years ago forest fires were rarely fought at all except as they endangered other property. Then it was a case of neighbor help neighbor when a fire became an obvious menace; and the equipment and methods used were of the crudest. A forked stick for clearing a line through the leaves, a piece of brush or a wet gunny sack to beat down the blaze, and garden shovels, hoes, and rakes were the common implements. There was no order, no planned organization, no conception of the strategy and methods necessary in fighting big fires, no knowledge of their behavior, no system of detection and speedy alarm, no preparation beforehand for swift attack, and only the most elementary beginnings of fire prevention.

All of this has changed. State and Federal agencies working together have evolved organizations, equipment, and methods that work with precision and dispatch and are fairly well standardized throughout the country. Observation stations of steel or wood placed high enough to command an extensive view, often on towers rising more than 100 feet from the ground, now dot much of the wooded area of the country. When the systems are completed these stations will afford a coordinated and interlocking oversight of entire regions from strategic points 15 to 20 miles apart on an average—though the distances vary greatly with the topography and other factors that determine the range of visibility. Already the stations embraced in the State protective systems number more than 800. In some localities they dovetail with the detection systems maintained by the Federal Government on the national forests, now equipped with nearly 1,400 lookout stations.

From the glass-enclosed cupolas on top of the towers qualified men maintain a watch for the first sign of rising smoke that betokens the beginning of a fire. Equipped with binoculars, maps, and instruments, they are able to place the fires reasonably closely. When one is discovered the alarm is immediately transmitted by telephone to rangers or wardens, who are expected to be in readiness to start at once for the reported location of the fire. They are provided with up-to-date fire-fighting equipment. It still includes shovels and hoes, but increasing use is made of horse-drawn or motor-drawn plows and of special implements and machinery of various kinds. Water-throwing devices are very generally employed; they include not only knapsack pumps that are operated by hand but also portable power pumps that can be set down wherever water is obtainable and will deliver a stream through a hose to a fire that may be a mile distant. There are hundreds of these power pumps and thousands of the knapsack pumps in use today.

This is only a glimpse at a single part of the entire organization necessary for an efficient system of protection, but it will give some idea of the care and thoroughness with which the work must be planned beforehand and every eventuality made ready for. For fires which reach a size too great for one man to handle crews must be assembled and dispatched, in accordance with arrangements previously made for bringing them together and getting them off swiftly, with the necessary equipment and competent leadership. Fire fighting is an art which must be learned through special training and experience, and the leaders must be given this training if the crews are to function effectively. The greatest possible speed in discovering, reporting, and moving against the fire is one of the fundamentals; competence in handling it is another; not to leave until it is dead out, another. Detection and suppression, however, are far from constituting the full field of the activities of a modern protective organization. The State foresters lay nearly, if not fully, as much stress on measures of prevention.

Regulatory laws make possible some control of the conditions which tend to cause fires, and law enforcement through discovering the persons who have set or caused fires, collecting the evidence necessary to establish their guilt in a court of law, and bringing about their prosecution, is an important deterrent of subsequent negligence or incendiarism. Still more important is effective use of all possible instrumentalities of public education. The press, the radio, publications, lectures, moving pictures, and even proclamations by the governors are made use of.

There is pretty general agreement as to the best type of organization for a State protective system and the best methods to be used in the protective work, and the States are gradually approaching a common pattern. However, there is still a decided diversity in their organization, their methods of financing the work, the progress they have made, and the results they obtain. The State foresters are circumscribed in what they can do by controlling legislation and by their appropriations. The length of time that the Forestry Department has been engaged in the work of protection also has a good deal to do with the stage of progress reached and the results obtained. For example, educational work is cumulative in its results as the years pass.

Reference has already been made to the laws governing the appointment of the State foresters. In a number of States the position is one which may be subjected to political pressure. In a few cases this untoward influence may carry down through the field force of fire wardens or rangers.

The method provided for selecting the local field force differs rather widely. In some States, for example, Pennsylvania, New Jersey, and Connecticut, the wardens are chosen by the State forester. In other States, as in New Hampshire and Massachusetts, they are at least suggested by town officers, and in some of the far Western States the organization of the protective force is principally in the hands of timberland owners' associations. There are also wide differences in the method of financing the protection activity. In 18 States no part of the expense is borne by the private owner. In Kentucky, West Virginia, Montana, Idaho, California, Oregon, and Washington the expense is divided between the public and the landowners, the public share being derived partly from the Federal cooperative contributions and partly from State funds. Three of these States (Montana, Idaho, and Washington) confine the expenditures of their own funds to State-owned lands.

In New Hampshire, all owners of 1,000 acres or more must furnish protection up to a certain cost per acre. In Vermont, owners of unoccupied or unenclosed forest land may be called upon to meet a portion of the cost of suppression when it exceeds a fixed ratio of the taxes to be raised in a town. In the so-called "forestry district" of Maine, the fire protection funds are raised by a $2\frac{1}{4}$ mill tax on all property. Most of this region is timbered, so that the tax practically amounts to the timberland owners bearing the burden. In Connecticut, Maryland, Virginia, West Virginia, Wisconsin, Oregon, and Washington, a part of the expense is placed upon the counties; in California, a part may be assumed by the counties; in Maine (outside the forestry district), New Hampshire, Vermont, Massachusetts, Rhode Island, New York, and Wisconsin, a part is placed upon the towns. Meager State appropriations rather than laws have laid a large share of the cost of protection upon cooperating timberland owners in Alabama, Florida, Georgia, Louisiana, Mississippi, Oklahoma, and South Carolina, and to a less degree in Texas.

Except for relatively small areas, protection effort is now State-wide in most regions. In the central group of States, however, only about 30 percent of the area and in the southern group only 24 percent are under organized protection. Lack of sufficient money and the short time since protection activities were initiated are largely responsible for incomplete coverage of the area in these two regions. Dearth of funds is of course partly a reflection of lethargic public sentiment.

Results obtained by the States.—The results of organized protection by the States are more real than apparent. Along with the development of protection methods there has been taking place the tremendous development of automobile travel and road systems, which has brought a vast increase in the fire danger. Streams of people now pour year after year into and through the wooded country. Campers, picnickers, hunters, fishermen, and mere travelers along the roads make up a veritable host of potential fire causers. Rarely do they purposely set fire to the woods; ordinarily they doubtless never know

it when they have been fire causers. The thoughtless discarding of burning matches and tobacco is an example of the forms of carelessness that may easily originate a fire which does not become evident until the person responsible for it is far on his way. On their face, the statistics relating to the number and the size of fires fail to give a fair picture of what has actually been accomplished in fire protection. This is notably true in the South, where, as protection has been extended more widely, better data on fires have been obtained, with the result that the count doubtless includes many fires about which, had they occurred in earlier years, nothing would have been known. Reports from Pennsylvania and Massachusetts, in both of which State-wide protection has been in effect long enough to make the data reasonably comparable for a series of years, show in one case an apparent trend in the direction of a smaller average size of fire and in the other a trend in the direction of a smaller number of fires. There are, however, too many variables that affect the record to permit of drawing any definite conclusion, one way or the other, from these figures. Table 4 shows the Massachusetts and Pennsylvania record.

TABLE 4.—*Number and average size of forest fires in Massachusetts and Pennsylvania by years, 1921–31*

Year	Massachusetts		Pennsylvania	
	Number of fires	Average size	Number of fires	Average size
		<i>Acres</i>		<i>Acres</i>
1921.....	2,849	10	2,384	78
1922.....	4,099	21	3,634	91
1923.....	2,672	18	3,539	106
1924.....	3,735	13	1,998	48
1925.....	3,310	13	2,603	49
1926.....	2,860	12	2,916	47
1927.....	2,029	17	1,247	30
1928.....	930	14	2,534	44
1929.....	1,198	14	2,461	17
1930 ¹	1,922	38	¹ 6,789	46
1931.....	1,195	16	² 4,014	37

¹ 1930 was a very severe fire year. ² 1931 was a severe fire year in Pennsylvania.

A comparison of the results of protection in the several forest regions will serve to throw light on what the States are doing. Various indicators of the accomplishments will be successively considered. It should be borne in mind that no one of these indicators by itself affords a satisfactory basis for judging as to the results. In combination, they bring out a single composite picture.

The diversity of conditions in the several regions has to be taken into account in interpreting the tabulated data. It is much easier in some regions than in others to make a good showing. Climate, terrain, the character of the vegetation, available roads, population density, water supplies, and the like interact with the preparedness, equipment, and general efficiency of the organization to affect the result. Again, the importance of confining all fires to a small area varies greatly. To attempt to give equally intensive protection everywhere would be unjustifiable; costs must be balanced against results. Where fires are likely to start at remote points in sparsely settled country and run fast through open forests or over grassland-

without doing much damage, it would be extravagant to maintain a protective system designed to insure keeping all the fires small, and impossible to obtain a showing of results in this respect which would compare favorably with those easily attainable and necessary to seek under the opposite conditions.

In the section of this report entitled "Protection Against Fire" the regional expenditures for the protection of State and private lands are compared on the basis of the ratio between the annual expenditures and the total acreage of these lands needing protection. For the period 1927-30 the annual per acre expenditures averaged, on this basis, as follows:

	Cents		Cents
Central.....	0. 40	Lake.....	2. 01
South.....	. 43	Middle Atlantic.....	2. 77
South Rocky Mountain.....	. 89	Pacific coast.....	3. 28
New England.....	1. 94	North Rocky Mountain.....	5. 90

Neither as an indicator of the varying cost of adequate protection in the several regions nor as an indicator of the relative intensiveness with which the States are actually applying protection does this showing accurately reflect the situation. In the two regions in which the lowest expenditures are shown only a minor fraction of the forest area in need of protection is receiving it. The coverage in the central region is only a little more than one third and in the South only about one fourth complete. In all the other regions but one, however, it is close to complete, and in that one is more than 92 percent complete. Further, some expenditures are included outside those made in maintaining the State protective systems. With due allowance for these facts, the figures serve to give an approximate idea of the cost of the protection that is being given in these eight forest regions. The costs shown do not at all indicate the absolute per acre needs of the several regions and indicate only in a very rough and tentative way their comparative needs, concerning which more will be said later. It should be borne in mind also that the expenditures of the individual States within a region often vary substantially.

Table 5 compares the results during the period 1926-30, by regions, in terms of the total number of fires, the number per 100,000 acres protected, their average size, and the ratio between area protected and protected area burned.

TABLE 5.—Regional results of protection as shown by the number and average size of fires and by the ratio between area protected and area burned over. Average for years 1926-30

Region	Fires			Area burned per 100,000 acres pro- tected
	Number		Average size	
	Total	Per 100,000 acres pro- tected		
			<i>Acres</i>	<i>Acres</i>
New England.....	3, 643	11. 7	26. 3	308
Middle Atlantic.....	6, 590	21. 4	49. 7	1, 081
Lake.....	4, 918	9. 5	113. 3	1, 081
Central.....	2, 868	18. 8	96. 0	1, 803
South.....	15, 893	31. 0	106. 7	3, 301
Pacific Coast.....	4, 964	12. 5	192. 4	2, 415
North Rocky Mountain.....	1, 166	9. 3	93. 2	871
South Rocky Mountain.....	149	3. 2	33. 3	109

There is a discrepancy between the showing made in table 5 of the area burned per 100,000 acres protected and some apparently corresponding data in the sections of this report entitled "Protection Against Fire" and "Federal Financial and Other Direct Aid to the States." The discrepancy is due to the fact that, for the purposes of the present table, the area protected is reckoned on the basis of the entire area covered by the protective set-up, irrespective of the character of the cover. Brush and grass lands must often be protected along with forest lands if fire is to be kept out of the forest.

The last three columns in table 5 show the comparative standings of the regions when rated on the basis, respectively, of the number of fires for a uniform acreage under protection, the average size of the fires, and the average yearly burn for a uniform acreage. On each basis a different order is set up. Average expenditures per acre produced the order shown on page 809. None of these comparisons bring definitely into the picture such essential parts of it as the varying difficulty of the job and the degree of intensiveness of protection which the varying values at stake and their varying susceptibility to fire damage justify. Nor do they take into account what proportion of the entire area needing protection is actually receiving it.

Disregarding for the moment the showing of the South Rocky Mountain region, which is due to exceptional circumstances, not to intensive State protection, New England is here shown as outstanding in the low ratio of area burned to area protected. This reflects in part favorable conditions for keeping fires small, in part the fact that protection is strongly backed by public sentiment, well supported financially, well organized, and strengthened through long seasoning—a product of many years of continuous upbuilding. The North Rocky Mountain region takes its place next to New England, and slightly above the Lake region, in spite of the fact that it includes the part of the country where climate, topography, and wilderness conditions combine to make the problems of effective protection more difficult than anywhere else in the United States. In the North Rocky Mountain region the loss which may result from fires on the State and private lands covered by the State protective system is so great that the owners consider much heavier per acre expenditures than are made anywhere else fully justified. The average of nearly 6 cents per acre per year was shown on page 809 to be far above that of any other region; and even so, the average partially disguises the situation from the fact that it is held down by relatively low protective costs in southern Idaho and in eastern and central Montana, as compared with western Montana and northern Idaho, where the average expenditures may run more than twice as high as the regional average. It should be said, too, that the severest task of protection in this region falls upon the Federal Forest Service, in taking care of the national forests, which generally speaking are less accessible, higher lying, and of more rugged terrain than the State and private lands.

The South rates lowest in the comparative showing based on the ratio of burn to the entire protected area, partly because in the "piney woods" country fires easily run over large areas, often without doing much damage, partly because the custom of woods burning is deeply ingrained, partly because the State protective work is too new to have gained a very firm hold. In the central region also the work is relatively new, and further is not well supported, either financially

or by public opinion; the per-acre expenditures in this region are the least anywhere. The Pacific Coast region rates between the Southern and the Central region, in spite of the fact that its average per-acre expenditures is exceeded only by that of the North Rocky Mountain region. This is chiefly due to the fact that in a large part of the Pacific Coast region protection is made difficult by a very protracted dry season, and brush and grass fires are likely to spread fast and run widely.

Of the seven States comprising the south Rocky Mountain region only three have entered into comparative agreements with the Federal Government for the protection of any State or private lands against forest fires, and of these three, two utilize in whole or in part the organization maintained for protecting the national forests in lieu of independent field organizations of their own. The total area of State and private lands in the South Rocky Mountain region given protection in the years 1926-30 exceeded 4,500,000 acres, but more than 96 percent of this area was protected by the national forest organization. In New Mexico, which obtains an allotment of Federal cooperative funds for protection, the actual doing of the work is made over entirely to the Forest Service under a special arrangement in the nature of a contract. This is because the State and private lands protected are either intermingled with national forest lands or so close to them that a single protective system affords the most practical and economical means of doing what is really all one job. In Nevada the Federal and State organizations, while mainly separate, partly coalesce. In the rest of the States in this group, except South Dakota (which has a field protective organization primarily to take care of the Custer State Park), such protection of State and private lands as is afforded by a public agency is given by the Forest Service in connection with national forest protection and in consequence of the fact that to protect the national forests it is necessary to protect also intermingled or adjacent lands not federally owned. To a small extent the apparent relationships shown in table 5 for other western regions may lack accuracy because of a similar inclusion of results of protection incidentally given by the national forest organization with the results of protection given through State protective organizations.

The South Rocky Mountain region affords less of an opening for State forestry than the other regions because the national forests include the great bulk of the productive timberlands. Also, the task of protection is lighter in this region than almost anywhere else. An evidence is the relatively low expenditures of the region shown on page 809; incomplete data indicate an expenditure of only 9 mills annually. On the other hand, New England and the Lake States spend about 2 cents an acre, the Middle Atlantic States about 2.75 cents, the Pacific Coast States about 3.25 cents, and the North Rocky Mountain region nearly 6 cents.

To obtain a means of setting up suitable standards of performance or objectives in protection, and to provide a criterion for judging the satisfactoriness of the actual performance measured against the objective, the Forest Service and a number of the States employ a method of rating comparative protection requirements in terms of what is known as "allowable burn." This is an arithmetically expressed judgment of the maximum amount of injury by fire that a given type of forest can be subjected to without serious impairment of the forest

values basic to the predominant purposes of management. While the damage done to the forest by individual fires varies widely, even in a given type of forest, depending upon the intensity of the fire and the particular condition of the area, if a sufficiently large area is under consideration it is possible to fix upon a protection objective based on average consequences. Over a long term of years, if the annual burn does not average above a certain small percentage of the total area under protection, the aggregate injury done will not, from the standpoint of the total area, generally defeat the purposes of management—though it may in individual cases; just as a satisfactorily efficient city fire department provides no guarantee that an individual business with fire risk uncovered by insurance may not be bankrupted by a bad fire on its premises, or that a conflagration may not deal the whole city a severe blow. In other words, “allowable burn” does not mean that if fires are held, over a term of years, to an area limitation of a certain annual percentage of the entire area protected, damage will be eliminated or ruinous losses will universally be put an end to; but it sets up an objective of public policy based on what appears to be necessary in the interest of the general welfare. Beyond that, the problems are individual and are left to the individual.

Whether protection that conforms with standards thus established may appropriately be designated as “satisfactory” depends on the meaning attached to this word. To assume that any standards now set up will be permanently satisfactory would be unwise. Time brings progress. Whether the passenger automobiles of today can be termed satisfactory machines depends on the viewpoint. Certainly they are not satisfactory to their manufacturers; each year sees changes in the models. So it is with forest-fire protection. One or more States are even now keeping their fires within limits that they set up as objectives a number of years ago. Most of them are not, but they are striving for it. Some may not be making rapid progress, for reasons beyond their control. Some may have set up goals beyond their reach, beyond what the State and cooperating agencies can or will pay for at present. In no case, however, is the organization resting on its oars. Improvement of the personnel, of the equipment, of relations with the public, and of methods are being sought even in the States that are already accomplishing all that they set out to do.

In another section of this report, entitled *Protection Against Fire*, the authors have set up standards by which to rate the adequacy of the protection now being given the forests of the country regionally, through a comparison between “allowable burn” and actual burn. Table 6 shows the results obtained in the 5-year period 1926–30 and the relationship between these results and the degree of intensiveness of protection which would be necessary to make the average annual burn equal to the “allowable burn” as estimated by the Forest Service, on the basis of present knowledge. The 5-year period is too short to afford an entirely dependable basis for a rating of the performances; but the progress that is steadily being made by the States in the effectiveness of the protective work and in the extension of the area covered would tend to make the showing less, rather than more representative were the record prior to 1926 included. Because the figures for the South Rocky Mountain region do not represent the results of organized protection administered by the States themselves, this region is not brought into the showing.

TABLE 6.—*Regional results of protection as shown by the ratio of the "allowable burn" to the area burned over annually*

Region	Allowable burn	Protected area		Total area (including unprotected)	
		Actually burned 1926-30 average	Percent adequate	Actually burned 1926-30 average	Percent adequate
	<i>Percent</i>	<i>Percent</i>		<i>Percent</i>	
New England.....	0.16	0.31	51.6	0.31	51.6
Middle Atlantic.....	.35	1.08	32.7	1.04	33.7
Lake.....	.36	1.08	33.3	(¹)	(¹)
Central.....	.59	1.80	32.8	3.16	18.7
South.....	1.34	3.30	40.6	19.01	7.0
Pacific Coast.....	.49	2.41	20.3	2.43	20.2
North Rocky Mountain.....	1.05	.87	120.7	1.04	101.0

¹ Data not available.

Measured by this yardstick, the North Rocky Mountain region makes the best showing, New England comes a long distance below, and the other regions take their places still farther down.

Conditions necessary for efficiency.—Various reasons may account for an unsatisfactory situation, where one exists—personnel, type of organization, political interference, lack of suitable legislation, inability to obtain law enforcement, lack of money, newness of the work, and so on. The most important single requirement for success, of course, is suitable financial support.

Most States have not as yet provided adequate financing of the job. The total estimated cost of adequate protection as worked out in 1930 for each State by the individual State forestry departments in cooperation with the Forest Service was \$13,386,000; while calculated by regions on the basis of the standards set up in the section of this report entitled, Protection Against Fire, the total estimated cost of adequate protection is placed at approximately \$20,000,000. The State budgets for 1933 provide a total of \$6,142,500; this includes all State, Federal, and private funds that will be available for expenditure under State supervision. While these budgeted expenditures will be considerably augmented by independent private protection work, the gap left will still be of very formidable dimensions.

Of equal importance is stability of funds. To have an effective organization there must be a substantial measure of permanency in the field force, so as to build up and utilize experience. Wide fluctuations in the financial provisions for the work disrupt its continuity. Where dependence must be placed principally or largely upon private cooperative funds, or game and fish license receipts, or taxes upon timber or timber products, the revenue is likely to fluctuate, making the organization unstable. Several of the Southern States derive most of their financial support other than the Federal contribution from the voluntary cooperation of private owners, which in times of depression falls off materially. In a few of the far Western States, where private participation in the expense of protection is required by law, participation can be avoided by allowing the lands to revert for taxes. There is no assurance of continuous protection of the lands after they have been logged and the valuable merchantable material removed. Their owners may feel it economi-

cally unsound to meet the cost of protecting cut-over lands. That receipts from severance taxes or other special taxes form an uncertain source of funds is exemplified by the case of one of the Southern States, in which a fall in the proceeds of a special tax from about \$50,000 in 1928 to \$20,000 in 1932 necessitated a reduction of 3½ million acres in the forest area protected and forced the dismissal of several of the key men in the State organization.

Next to the amount of money available for the support of the work, the most important factor in determining the degree of success is personnel. Everyone will concede that there are differences of ability in the personnel of the many State organizations, both in the higher and in the subordinate positions. It could not be otherwise. It is reflected, naturally, in the accomplishments. Good men even in a poor type of organization will accomplish a great deal.

Yet they cannot accomplish the impossible. They can only very gradually reduce the number of fires and area burned. Bad years will completely upset their record. They cannot change lifetime woods-burning habits or woods-burning indifference amongst the great mass of the population of a State without years of persistent and patient effort. The fire record of the South suffers because of the fact that protection is a comparatively recent undertaking in that region. It will improve; it has already improved greatly, as a result of organized effort, in much of the region. Protection cannot be so good, other things being equal, in a State that has only undertaken the job within the last 5 years as in one that has been at it for 20 years. It takes time to build up public interest, methods, the physical plant, and personnel.

Developments in State forest fire protection have come along gradually. They will doubtless proceed gradually in the future, with acceleration particularly in the Southern and Central States. There will be no overnight changes. The principles underlying success in this activity, however, are now well known in all States, the technique applied to the job is improving, the suppression equipment is vastly better than formerly and is constantly being added to and improved (use of the airplane and the radio are recent developments), and public sentiment is increasingly favorable.

The State organizations have directed their effort and thought upon the forest fire problem to good effect. Given the funds, the legislation, and the time, they have demonstrated their capacity to cope with it. Their understanding of local conditions, habits of the people, and sentiment has been a big factor in their progress. It seems evident that centering forest fire protection of State and privately owned lands in the State organization is the key to its successful prosecution. There is no good reason for other than steady progress in this field. The work will, of course, be more capably administered in some States than in others. Situations will doubtless arise that will call for a change in personnel. Additional legislation is necessary here and there; more emphasis could well be placed on prevention measures; but, in the by and large, sufficient funds and time are the two main essentials.

Forest fire protection is now handled as a joint cooperative enterprise of the States and the Federal Government. Aside from the Federal funds supplied, the newly organized State forestry departments, at least, are tremendously benefited by having thus made

available to them the fund of experience gained in the protection of Federal forest lands and in the protective activities of other cooperating States. The history, progress, and results of this cooperative enterprise are discussed fully in the section Federal Financial and Other Direct Aid to the States.

It cannot be expected that the set-ups for protection in the various States will all fit precisely the same pattern. At least there will be differences in details. Nevertheless, from experience gained to date, it seems possible to outline the general features best adapted to meet the needs.

Forest protection against fire is a specialized activity. During the last 30 years there has been built up a body of knowledge of the behavior of fire under varying conditions, the causes of fire, and the most effective methods of preventing and suppressing fires, which warrants calling the protection job a technician's job. While forest protection against fire is not by itself the practice of forestry, nor is a technician in protection necessarily on that account a technical forester, the art and the science of fire control pertain to the art and the science of forestry, and other things being equal, a protective organization in which well-trained and experienced technical foresters largely fill the higher positions is much more likely to be effective than an organization little influenced by professional education, contacts, and attitudes.

This is the more important because as a public activity protection should be directed from a forestry viewpoint. Its objectives are forestry objectives. It should be planned along lines designed primarily to safeguard the future welfare and productiveness of the forest as a resource, not simply to safeguard private property in standing timber. Consequently, while it would be erroneous to hold that a good administrator of a State system of fire protection cannot be developed from a capable woodsman qualified for executive and managerial responsibilities but untrained in technical forestry, as a rule and in the long run recognition of the job as one which should be either performed or supervised by a trained forester will bring the best results.

Were the protective work the only need of the State in forestry, the advantage in having a technical forester in charge of it, as against a competent nontechnical man with the right viewpoint, would not always be very material. But the interests of the States call for a work of all-around leadership toward better use of the forest resources. Rarely is the undertaking of the State in forestry confined wholly to protection. Even where the immediate reason for organizing a forestry department has been to provide the machinery necessary in order to qualify for Federal cooperation in the work of protection, the basic law ordinarily contemplates other activities. The State forester's function normally includes a broad leadership in forestry generally through enlightening the public, assembling the information necessary to guide the development of a sound State policy of forestry, and giving expert advice in the fields both of public and of private policies and practices. In addition the State forester may and ordinarily does have technical duties either of forest land administration or of forest-nursery management.

It has already been brought out that in an overwhelming majority of cases State departments of forestry are now headed by technically

trained foresters, although only in a small minority of cases is this required by law—plain evidence that the desirability of placing the work in the hands of professional foresters has been generally recognized. Some States make legislative provision for a chief fire warden under the State forester. Where the position is not specifically created by law, the typical organization of the work of his department set up by the State forester usually places one man in general charge, under him, of the protection activity. A functional staff organization in the State forester's office with specialists in charge of the several lines of work is customarily supplemented by a territorial organization under which the State is divided into districts, each with a district forester in immediate charge, in varying degree, of all the activities of the Department within his territory. This general form of organization corresponds closely with that of the Forest Service for the entire country, and has pretty well established itself as the most effective type of set-up where the work has attained important dimensions, with diversified activities. The local wardens or rangers, lookout men, and other members of the field protective organization are under the direct supervision of the district foresters, who should generally so far as possible be men of professional training.

As in any private business, the efficiency and competence of a State forestry organization is determined by the efficiency and competence of its chief executive within the limits of the possibilities afforded by the resources at his command and the conditions with which he is confronted. Nothing is more important than a machinery of organization likely to obtain a State forester who, in addition to being a technically trained man of good experience, has the initiative, energy, sound judgment, ability to lead and to inspire confidence, and other qualities essential for a successful executive. This is a matter, first, of selection, and secondly, of oversight. There must, of course, be oversight, to assure that the responsibilities of the position are fully met, and means of bringing about a change where the best interests of the work call for a change of leadership. How to obtain in the administration of public enterprises high-grade executive ability and how to provide for a proper oversight of the way in which responsibilities are discharged is one of the problems of government.

The greatest obstacle to more satisfactory conditions is the degree to which divided purposes enter into the administration of the public activities. In the struggle of contending parties, groups, and individuals for political power the use of offices, of the public payroll, and of administrative courses and decisions as aids in gaining or holding power is bound to take place unless there are restraining forces or bars. Hence the development of devices designed to enable administration to be carried on with as much separation as possible from political considerations in the narrow meaning of the term. Essentially, they are devices to protect the public against political racketeering. Civil service laws to insure the filling of positions on a basis of merit, the elimination of incompetent employees, and the protection of all incumbents against dismissal, demotion, or failure to receive advancement on other grounds than the efficiency of the work are one of the devices to this end.

There use in State governments is, as a rule, rather limited. Whether or not they are used, they do not obviate the need for some means of obtaining accountability of the man at the head of an organ-

ization for the quality of performance of his unit, or for means of directing policies and tying them in with the general program and purposes of the State government as a whole. To meet the latter need, the device of directive boards or permanent commissions intended to function essentially as do the boards of directors of corporations has been widely used.

There are some obvious drawbacks to this form of organization. On the other hand, it has some outstanding merits, and in the main appears to meet most closely the needs of State forestry work. This is most true before the department has attained the stability and prestige that come with time and widespread popular endorsement of its activities.

Sound principles of administration may seem to be violated by a plan which diminishes the control of the Governor of the State, as its supreme executive, over all its departments. The multiplication of semi-independent departments through the setting up of one commission after another has undoubtedly tended to make State governments unduly complex, cumbersome, decentralized, and expensive. For one thing, this increases the difficulty of firm fiscal control. On the other hand, oversight of the work of the State forester by a nonpolitical board with staggered terms of several years not only safeguards the work very substantially against being politicalized but also pretty well guarantees stability of policies. With an interested and capable board, it affords wise guidance of the department, support of and assistance to the State forester in accordance with his merits and the need of assistance from his directors to accomplish his purposes, and a suitable body for sizing up his efficiency and, in case of need, replacing him by a stronger man. But to obtain these results the board must be in fact nonpolitical as well as capable; must command enough public confidence in both respects so that neither its motives nor the soundness of its judgment will be open to reasonable suspicion; and must be sufficiently interested in the work to be always in full touch with it. Such results are not assured merely by setting up the board or commission form of organization.

It goes without saying that, whatever the method provided for selecting the State forester, merit only should govern both his appointment and his retention in office. In public business, as in private, nothing else plays so large a part in determining success as the qualifications for his job of the man in charge. Two dangers to be particularly guarded against in public administration are, on the one hand, that mediocre men will be put in and, having once got in, will become permanent fixtures, and, on the other hand, that good men will not be given the support and the freedom from political interference necessary for large accomplishment. With conspicuously competent State foresters in every State, properly backed up by public opinion and given a fair chance by the State, the forest situation of the country would take on a different aspect.

The subordinate year-long personnel of the departments should be subject to the same conditions of appointment and retention on a merit basis solely as the State forester himself; their choice should be in his hands. The field force of part-time men, ordinarily called fire wardens and patrolmen, should be subject to supervision by the State forester, should also be chosen and retained on the basis of merit only, and preferably should be appointed by the State forester

without interference from other sources; if they are appointed or suggested for appointment by town or county officials, the State forester should have absolute authority to approve or reject them and to dismiss them for cause.

The organization should embody to a well-balanced degree the features of prevention, detection, and prompt suppression of fires.

Well organized prevention must give an important place to vigorous and sustained educational activities, conducted through varied means of reaching the public, which should include suitable provision for press contacts and publicity. Prevention should include also the taking of special precautions during the dangerous fire season—sending out fire warnings to the public, the use of patrolmen, close cooperation with the State police, strict enforcement of laws, such as the permit and the brush disposal laws, designed to hold in check the originating and the spread of fires, and closing of the woods when necessary by proclamation of the governor. Prevention of fires should have a more prominent place in the picture, be given more persistent attention, than is commonly the case now.

Detection of fires should be provided for by well constructed and well distributed observation stations, each in charge of a man supplied with equipment for locating fires and connected by good telephone service with the fire suppression forces. His duty is to discover and report promptly woods fires that come within his vision. He should be closely supervised by his superior officer. Detection may require the use of airplanes now and then, at times when the observation stations are not effective or in places where they do not sufficiently command a view of the entire terrain. The major uses of airplanes in protection, however, are now in suppression activities, to scout fires and to transport men and supplies rapidly. Detection should be improved by inducing landowners, residents, and the traveling public to report all fires promptly.

The State suppression force must be organized with two fundamental points in mind. The first is that of starting promptly to a fire with equipment and men as soon as it is reported; the second is that of staying with it until it is dead out. Presuppression activities, getting ready for fires, should be well looked after. Equipment should be purchased, put in first-class shape, and made available for quick use; needed roads and trails should be developed as rapidly as possible; sources of water should be located, marked, and improved; the men in permanent employ should be schooled and trained in the best known methods of fire suppression; they should be required to know their territory intimately; crews of fire fighters should be organized beforehand wherever that is possible; and arrangements should be made in advance for transportation, food, and other supplies for fire fighters in those relatively inaccessible regions where it is necessary to provide camps for the men. Preparation for fires and training of men to apply the most up-to-date suppression technique known are the two main essentials of success.

The methods set up for protection are in a constant evolutionary process. They are being improved all the time. The emphasis given to various elements of the field organization will vary by States and regions. Forces of men that can be quickly mobilized and transported to the fires are fundamental features. Up-to-date equipment in good repair and in sufficient quantities is essential. Adequate and

competent supervision of the fire-fighting crews is tremendously important. And last, determination and everlasting persistency until a fire is completely extinguished are necessary.

State ownership and management of forest land may be the key to successful forest fire protection in some States. The man in charge of a State forest and the crew of men working there can very well be the nucleus of the fire-fighting force that serves the surrounding region. Where this plan is already in effect, it is proving very satisfactory. It seems like the logical development in any State that is building up a system of State forests.

Division of costs.—Table 7 shows, by regions, the present distribution of the costs of maintaining the State systems of cooperative protection.

TABLE 7.—*Distribution of cooperative fire protection costs among the participating agencies by regions, fiscal year 1932*

Region	Expenditures				Distribution of expenditures		
	Total	Federal	State, county, and town	Private	Federal	State, county, and town	Private
					<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
New England.....	\$500, 771	\$132, 047	\$354, 930	\$13, 794	26. 37	70. 88	2. 75
Middle Atlantic.....	1, 039, 271	173, 166	863, 743	2, 362	16. 66	83. 11	. 23
Lake States.....	1, 547, 323	278, 746	1, 246, 361	22, 216	18. 01	80. 55	1. 44
Central.....	217, 482	90, 499	107, 920	19, 063	41. 61	49. 62	8. 77
South.....	900, 633	407, 989	313, 341	179, 303	45. 30	34. 79	19. 91
Pacific Coast.....	1, 258, 231	386, 133	298, 098	574, 000	30. 69	23. 69	45. 62
North Rocky Moun- tain.....	459, 606	99, 396	86, 333	273, 877	21. 63	18. 78	59. 59
South Rocky Moun- tain.....	17, 796	4, 387	4, 081	9, 328	24. 65	22. 93	52. 42
Total.....	5, 941, 113	1, 572, 363	3, 274, 807	1, 093, 943	26. 47	55. 12	18. 41

A glance at the percentages in the last three columns of the table shows great variations between regions in the relative share of the Federal Government, the State and local governments, and the private owners. Thus, in the Middle Atlantic region the private contribution in 1932 was only a small fraction of 1 percent of the total, in the Lake region it was less than 1.5 percent, and in New England was 2.75 percent, but in the South it was nearly 20 percent and in the 3 western regions ranged from a little less than 46 percent up to nearly 60 percent. The Federal contribution was greatest in the South, where it exceeded 45 percent, and least in the Middle Atlantic region, where it was less than 17 percent; while the share carried by the State and local governments was greatest in the Middle Atlantic region (more than 83 percent) and least in the North Rocky Mountain region (less than 19 percent).

Space does not permit going very far into the reasons, important though they often are, for these regional variations; but it is necessary to point out in a broad way what the variations signify.

The Weeks law, which inaugurated the policy of Federal cooperation, merely required a State contribution at least equal to the Federal. The Clarke-McNary law of 1924 brought the private owners into the picture. The law was based on a conception of the work of protection as one in the benefits of which the Nation, the States,

and forest-land owners would all participate and towards the cost of which all three of the parties in interest should contribute. In the hearings on the bill prominence was given the idea that a reasonable and fair apportionment of the cost would be obtained if the Federal Government and the States should each pay one fourth of it and the private owners one half. As a measure of the extent of the Federal responsibility, this 1-1-2 ratio has ever since the passage of the law been widely accepted. Table 7 shows that Federal expenditures in 1932 made up 26.47 percent of the total.

The Clarke-McNary law, however, did not place any closer limitation upon the Federal share of the cost than the old Weeks law limit of 50 percent; and it broadened the earlier law by permitting county, town, and private contributions toward maintaining the protective system to count as part of the expenditures which the Federal Government might match. It was not the purpose of the law to lay down hard-and-fast requirements for the States with respect to distributing the costs. What was sought was the enlistment of all the agencies having interest, under such a form of arrangement as might be held by each State most feasible and appropriate to its own conditions. Consequently, the legislation has afforded a highly flexible basis for building up Nation-wide protection adjusted to local situations and regional needs and possibilities.

One of the objects sought in administering the Federal cooperative work has been to extend as much encouragement as possible to the States for its inauguration and to help get it on its feet after it has been inaugurated. In some cases this leads to allotments of Federal funds substantially equal to one half the total expenditures. The relatively high percentage of the Federal contributions in the southern and central regions shown in table 7 is thus explained.

The greatest divergence as between regions appears in the last column of the table, with a spread in the private expenditures from almost nothing in the Middle Atlantic region to nearly 60 percent in the North Rocky Mountain region. Conversely, the State, county, and town, contributions in the first-named region were 83 percent, but in the second-named were only 19 percent. While some eastern States require (as was previously pointed out) the payment by private owners of a certain part of the protection costs, the general trend in the East, except in the States embraced in the southern region, has been toward recognizing protection as primarily a public obligation. Nowhere has the conception of a Federal, State (or State, county, and town) and private sharing in the cost on one-fourth and one-half basis been accepted and applied as a working principle—although the Pacific Coast group of States collectively happen to show a fairly near approach to this distribution. In the West the inclination has been to require the private owner to bear most of the cost, beyond that met through Federal participation. The State contribution in several of these States is largely because of State land ownership, for the protection of which the State pays on the same basis as would a private owner, in proportion to the acreage owned. Were a deduction made of expenditures to protect State lands, the relative participation of the Nation, the States, and private owners in protecting private lands would show up in somewhat different ratios from those presented in table 7.

In the South, where the Federal Government bears for the region as a whole 45 percent of the cost, the States and local governments 35 percent, and the private owners 20 percent, the newness of the work in most of the region, the relatively small scale on which the States are prepared to finance the protective effort from their own treasuries, and on the other hand the desire of a good many landowners to obtain protection of their lands, have made this the only part of the East in which the private contribution makes up a substantial part of the total. The percentage derived from this source in some of the Southern States is considerably greater than for the region as a whole.

It should always be borne in mind that what is under discussion in this section is the protection against fire provided by means of organized State activities, as a public function. Private owners may, and in many cases do, make individual expenditures for the protection of their own property independently of the public protective system, just as the owners of factories, stores, and residential properties in cities supplement the protection afforded by municipal fire departments and regulatory ordinances, through private installations and precautionary measures of various kinds. Table 7 takes no account of such supplementary forest protection outlays by individuals.

The distribution of costs as between the State on the one hand and the counties or towns on the other hand takes many forms. Sometimes it is a matter of individual arrangement. Frequently either one half or all the cost of suppression is borne by the local units of government—sometimes as an initial outlay, sometimes through a requirement of reimbursement of expenditures made by the State. Oregon and Washington require the counties to meet one third of the State protection expenditures for all purposes, and Rhode Island requires the towns to meet the entire cost but reimburses them for half the outlay; and there are other forms of division. The requirement of an assumption of part of the cost of suppression by the local political units seems desirable. It brings closer home the feeling of responsibility for conditions likely to lead to fires, is thus of educational value, and may have a preventive effect.

PROTECTION AGAINST INSECTS AND DISEASES

There has been no development of State organizations to meet the damage and destruction caused by forest insects and forest-tree diseases comparable to that for combating forest fires. This is not because the damage from the former sources may not be great, but because it is less spectacular, more insidious, and does not endanger human lives. Further, widespread infestations are more difficult if not more expensive to combat successfully. Great areas of forests are laid waste by insects, and disease takes a tremendous toll of forest trees either by killing them outright or by causing decay. The white-pine blister rust is being strenuously combated by the cooperative efforts of the Federal, State, and town governments and private owners. Large sums of money are being spent in this effort.

The gypsy and brown-tail moths (both insects introduced from abroad) have been particularly destructive to forest trees in the northeastern States; heroic efforts and tremendous sums of money have been spent by the States, Massachusetts in particular, to combat

them. The States have not succeeded in controlling the gypsy moth; they have kept down its numbers, but now it threatens to extend its range westward and southward.

In Maine large areas of spruce and fir have been killed by the spruce bud worm, and attacks of the birch leaf miner are reaching alarming proportions. A well-balanced entomological staff in Maine keeps in close touch with insect depredations through the forest fire organization, conducts careful studies, and makes recommendations for control.

New Hampshire, Connecticut, and Ohio have made notable progress in investigations of forest-tree insects.

Laws of California, Massachusetts, New York, Oregon, and Vermont make it possible to require owners of property infested with insects to take measures necessary for their control; those of Maine and New Hampshire permit enforcement of private control measures for white-pine blister rust, while those of New York and Vermont do the same for any injurious diseases of forest trees.

REGULATORY REQUIREMENTS

The State laws which impose restrictions upon private owners in the United States are discussed in the section of this report entitled Public Regulation of Private Forests. As is there shown, except in Louisiana and New Hampshire State regulatory laws have not had in view the requirement of practices of utilization designed to assure the establishment of a new forest crop on the land cut over, but have been limited to requirements relating to the control of fire, insects, and disease. Of these the requirements designed to lessen the fire danger are the most extensive and important at the present time.

It is true, of course, that protection from fire is essential to the establishment of a satisfactory new growth, and that with adequate protection after lumbering forest perpetuation will in many cases be accomplished without the application of silvicultural practices in cutting the old stand; but broadly speaking, the objective of State requirements relating to compulsory patrol, slash disposal, snag felling, and the like is to prevent the spread of fire to surrounding property and to facilitate the task of fire suppression as a general public undertaking, rather than to maintain in a productive condition the particular piece of land in immediate question. Regarded from this standpoint, regulatory requirements relating to fire control are largely a form of State aid to enterprises of forestry, supplementing and integrating with the aid extended through organized systems of protection.

Legal restrictions or regulations are one thing; their observance and enforcement are another. The regulatory restrictions imposed by State laws upon private owners of timberland are in some cases well observed and enforced, in a few practically inoperative, and in others feebly or unevenly operative. Lack of observance by private owners may be due to unfamiliarity with the laws, or to a lack of respect for or belief in them, or to desire to escape expense. Their enforcement by the States is not all that could be wished. Among the reasons are the small number of men available for the work, the extent and difficult character of the terrain which has to be covered,

the hostility and obstruction often encountered, the lack of cooperativeness in some cases on the part of the State's legal officers, and the political influence which some law violators have and can bring to bear. It must be said, moreover, that very commonly the State organizations are not disposed to insist upon complete compliance with the law or regulations. This is apparently due to the belief that too strict methods will react unfavorably to their organization and to the accomplishment of their objectives.

It is not surprising that reports concerning some States indicate that of the regulatory measures relating to fire protection, the laws requiring slash disposal and snag felling are not so well observed or enforced as they might be, that costs of compulsory patrol are not assessed in full against individual land owners, and that individuals responsible for forest fires are not always punished. Nor have the regulatory laws which in two States provide for leaving seed trees, under certain conditions, on land that is being logged been generally observed or enforced. It is encouraging, however, that the enforcement of regulatory protective measures is improving, and is now much better than it formerly was. With increasing public interest and support, the task will grow less and less difficult.

The prospect for State regulation of logging operations is much more dubious. As a rule, there is little public demand for it, or persuasion that the public interest is in fact materially involved. An exception to this is found in some of the States in which water resources are of highest importance, and in one or two of these proposals of regulatory laws designed to assure the protection of watersheds are not unlikely to be advanced at almost any time, with strong backing of public sentiment. The regulation of logging operations by single States is certain to be made difficult by the objection that the operators might, and in some cases probably would, be placed at a financial disadvantage as against operators in other States; though intelligent regulation might sometimes have the effect of increasing rather than decreasing the operator's net returns. Legislation might easily be too ambitious, unnecessarily restrictive, founded in fact upon too little knowledge either of the art of woods management or of the operating problems of the lumberman. If the regulatory laws proposed were of the type in effect in Sweden, where local boards on which lumbermen are represented prescribe the measures to be followed on each particular piece of timberland cut over, opposition would doubtless be more readily overcome and in time something practically useful might be worked out. Effort directed along this line would be a forward step.

STATE FOREST LAND ADMINISTRATION

STATE FOREST LAND OWNERSHIP

In past years the Forest Service has at various times obtained from the several State forestry departments data on State forest holdings, classified under the three heads of State forests, State parks, and other forest lands. The classification was made by each informant in accordance with the local terminology or point of view; and this introduced various inconsistencies. The most recent compilation of

the data thus obtained, made under date of July 1, 1932, showed a total of 7,822,439 acres of State forests, 730,293 acres of forested or chiefly forested State parks, and 5,336,460 acres of other State forest lands. The present report, based on other data, makes a considerably different showing. The difference is mainly due to a more systematic procedure, designed to classify on a clear-cut, consistent basis throughout.

To obtain a uniform classification a set of definitions was drawn up. State forests were defined as individual land areas either specifically set aside by legislative act or established under legislative authority contemplating their permanent retention and administration by the State for forest (as distinguished from essentially park) purposes, and organized in definite units of administration; while State parks were divided into two classes, those chiefly forest and those not in major part forest land. State parks falling in the latter class are left out of consideration in this subsection. The definition adopted for the former class limited them to areas maintained to serve public recreational and inspirational (scenic) needs, with or without watershed protection as a secondary objective, and with the utilization of commercial products either prohibited or severely restricted. The criteria thus set up afford, it is believed, a more accurate picture of the situation with respect to State forests than has previously been drawn, provided it is borne in mind that in several States the definition shuts out a large area having a certain measure of qualification for the name. The excluded lands are neither organized forest units established with legislative sanction nor forest lands entirely unreserved and awaiting disposal, but are intermediate between the two. Of them more will be said presently.

In the section of this report entitled Forest Land the Basic Resource the area of forest land in State, county, and municipal forest ownership is given as 10,632,000 acres. In the present subsection an aggregate of more than 13,200,000 acres of forest land is shown as in State ownership, and the following subsection, Community Forests, shows 1,000,000 acres in these forests. The above figure of 10,632,000 acres, however, embraces only commercial forest land, suitable and available for the growing of timber of commercial quantity and quality. It therefore excludes forest areas withheld from use for timber production in order to safeguard higher public values for such purposes as recreation and scenic or watershed protection. For example, forest lands within State parks are outside the reckoning. While its showing of area in State, county, and municipal ownership is based on other data than those more recently gathered for the present and the following subsections, the amounts here shown are in approximate accord with the earlier total; for omitting State parks, they aggregate a little more than 11,500,000 acres, not all of which could be classed as available for commodity production.

Tables 8, 9, and 10 present the results of the restudy of State forest land ownership made for the present report.

TABLE 8.—*State-owned forest land under administration as State forests and parks, by regions and States, 1932*¹

Region and State	State forests				State parks ²		Total net area
	Units	Net area	Land in process of acquisition	Ultimate area under present State policy	Units	Net area	
	<i>Number</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>	<i>Acres</i>	<i>Acres</i>
United States total.....	405	4, 395, 549	2, 231, 636	12, 770, 000	323	2, 682, 509	7, 078, 058
New England:							
Connecticut.....	17	61, 714	1, 927	250, 000	34	9, 246	70, 960
Maine.....					1	5, 760	5, 760
Massachusetts.....	48	120, 000	2, 000	150, 000			120, 000
New Hampshire.....	24	32, 754		(³) (⁴)			32, 754
Rhode Island.....	2	410	100	(⁴)	13	3, 358	3, 768
Vermont.....	20	40, 960		100, 000	5	1, 348	42, 308
Total.....	111	255, 838	4, 027	500, 000	53	19, 712	275, 550
Middle Atlantic:							
Delaware.....	1	51					51
Maryland.....	10	50, 310	1, 124	200, 000			50, 310
New Jersey.....	8	48, 143	7, 555	200, 000	7	13, 306	61, 449
New York.....	168	74, 450	72, 130	1, 000, 000	55	2, 373, 804	2, 448, 254
Pennsylvania.....	20	1, 573, 754	40, 000	3, 000, 000	1	6, 055	1, 579, 809
Total.....	207	1, 746, 708	120, 809	4, 400, 000	63	2, 393, 165	4, 139, 873
South:							
Alabama.....	12	8, 905		20, 000	1	421	9, 326
Arkansas.....	1	25			1	1, 023	1, 048
Florida.....					1	4, 000	4, 000
Georgia.....	1	166			2	178	344
Louisiana.....	2	5, 888			2	318	6, 206
Mississippi.....	1	⁵ 23, 000					23, 000
North Carolina.....					2	1, 464	1, 464
Texas.....	4	6, 434		100, 000	42	4, 131	10, 565
Virginia.....	1	588					588
Total.....	22	45, 006		120, 000	51	11, 535	56, 541
Central:							
Illinois.....	1	3, 320			3	2, 785	6, 105
Indiana.....	5	23, 500	3, 000	100, 000	9	10, 535	34, 035
Iowa.....				(⁶)	31	7, 031	7, 031
Kansas.....						1, 318	1, 318
Kentucky.....	1	3, 624			7	4, 451	8, 075
Missouri.....					9	41, 133	41, 133
Nebraska.....						2, 661	2, 661
Ohio.....	8	52, 250	400	150, 000	12	5, 229	57, 479
Tennessee.....	1	39					39
West Virginia.....	2	15, 393				227	15, 620
Total.....	18	98, 126	3, 400	250, 000	71	75, 370	173, 496
Lake:							
Michigan.....	12	779, 773	83, 400	2, 500, 000	49	29, 277	809, 050
Minnesota.....	13	1, 030, 195	1, 700, 000	4, 000, 000	8	38, 900	1, 069, 095
Wisconsin.....	4	111, 100	320, 000	1, 000, 000	12	11, 552	122, 652
Total.....	29	1, 921, 068	2, 103, 400	7, 500, 000	69	79, 729	2, 000, 797
North Rocky Mountain:							
Idaho.....					1	5, 505	5, 505
Montana.....	7	203, 000					203, 000
Total.....	7	203, 000			1	5, 505	208, 505
South Rocky Mountain:							
South Dakota.....					1	61, 000	61, 000
Pacific Coast:							
California.....	3	⁷ 9, 933			14	36, 493	46, 426
Oregon.....	1	70, 113			(⁸)		70, 113
Washington.....	7	⁹ 45, 757			(¹⁰)		45, 757
Total.....	11	125, 803			14	36, 493	162, 296

¹ States which own neither State forests nor State parks are omitted. They include Oklahoma and South Carolina in the South region, North Dakota in the Lake region, and Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming in the South Rocky Mountain region.

² Only forested State parks included.

³ No further purchase.

⁴ Will accept gifts of land.

⁵ Land owned by State University; administered by State forester.

⁶ Survey now in progress which may yield recommended program.

⁷ Includes a land exchange nearing completion.

⁸ Oregon has 122 State parks containing 6,823 acres, the forested portion of which is unknown; not included in totals.

⁹ Mostly logged-off land.

¹⁰ Washington has 10 State parks containing 6,115 acres, the forested portion of which is unknown; not included in totals.

TABLE 9.—*State-owned forest land not under administration as State forests and parks, by regions and States, 1932* ¹

Region and State ²	Unreserved Federal grant lands	Lands acquired by—			Total
		Exchange	Purchase and gift	Other lands	
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
United States total.....	4, 621, 778	453, 243	520, 156	544, 929	6, 140, 106
New England:					
Connecticut.....				³ 2, 428	2, 428
Maine.....			187	⁴ 400, 000	400, 187
Massachusetts.....				⁵ 12, 500	12, 500
New Hampshire.....				1, 533	1, 533
Rhode Island.....				500	500
Vermont.....				200	200
Total.....			187	417, 161	417, 348
Middle Atlantic:					
Delaware.....				⁶ 91	91
Maryland.....				5, 246	5, 246
New Jersey.....				4, 291	4, 291
New York.....			43, 288		43, 288
Pennsylvania.....			⁷ 291, 240		291, 240
Total.....			334, 528	9, 628	344, 156
South:					
Alabama.....	270, 000				270, 000
Georgia.....				5, 940	5, 940
Louisiana.....	25, 000		1, 000		26, 000
Mississippi.....	300, 000				300, 000
North Carolina.....			60, 460	10, 000	70, 460
Oklahoma.....				21, 000	21, 000
South Carolina.....				⁸ 3, 500	3, 500
Texas.....				50, 000	50, 000
Total.....	595, 000		61, 460	90, 440	746, 900
Central:					
Illinois.....			⁹ 7, 160		7, 160
Indiana.....			¹⁰ 21, 979		21, 979
Kentucky.....				¹¹ 16, 700	16, 700
Missouri.....	¹² 40, 000				40, 000
Ohio.....			⁷ 10, 400		10, 400
Total.....	40, 000		39, 539	16, 700	96, 239
Lake:					
Michigan.....	12, 000	50, 000			62, 000
Minnesota.....	1, 230, 000				1, 230, 000
Wisconsin.....	192, 000		65, 000		257, 000
Total.....	1, 434, 000	50, 000	65, 000		1, 549, 000
North Rocky Mountain:					
Idaho.....	¹³ 958, 000				958, 000
Montana.....	¹⁴ 236, 000				236, 000
Total.....	1, 194, 000				1, 194, 000

¹ Exclusive of an estimated area of about 11,700,000 acres of tax-reverted land, mostly in the South region, the status of which is very unstable and uncertain, except for 1,250,000 acres in Michigan which is definitely in State hands.

² No lands reported for Arkansas, Florida, and Virginia in the South region; Iowa, Kansas, Nebraska, Tennessee, and West Virginia in the Central region; North Dakota in the Lake region; and Nevada in the South Rocky Mountain region.

³ State institution lands, Indian lands, etc.

⁴ These are lands in unorganized towns held in trust by the State for school purposes, until such time as the towns may become organized.

⁵ Incomplete.

⁶ 80 percent forested.

⁷ State game reserve lands.

⁸ State penal institutions.

⁹ In fish hatcheries, game farms, game refuges, only partly forested.

¹⁰ State institution lands, 3,500 acres; game preserves, 18,479 acres.

¹¹ Game refuges, 1,700 acres, and forest property of the agricultural college, 15,000 acres.

¹² State university land; possibly 10,000 to 20,000 acres of school land in counties.

¹³ Policy is to manage all forest land as permanent properties. Land alone is rarely worth statutory minimum price of \$10 per acre.

¹⁴ Forested State land is not subject to sale. Timber can be sold.

TABLE 9.—*State-owned forest land not under administration as State forests and parks, by regions and States, 1932—Continued*

Region and State ²	Unreserved Federal grant lands	Lands acquired by—			Total
		Exchange	Purchase and gift	Other lands	
South Rocky Mountain:	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
Arizona.....	¹⁵ 32, 000				32, 000
Colorado.....	154, 390	(¹⁶)	1, 610		156, 000
Nevada.....	2, 000				2, 000
New Mexico.....	¹⁷ 121, 000				121, 000
South Dakota.....				11, 000	11, 000
Utah.....	55, 000				55, 000
Wyoming ¹⁸	120, 000				120, 000
Total.....	484, 390		1, 610	11, 000	497, 000
Pacific coast:					
California.....	14, 463				14 463
Oregon.....	33, 000				33, 000
Washington.....	826, 925	403, 243	17, 832		1, 248, 000
Total.....	874, 388	403, 243	17, 832		1, 295, 463

¹⁵ To be retained by State and managed by U.S. Forest Service. Includes acreage of commercial saw timber only.

¹⁶ Prospect of exchange with Federal Government for a State forest of 75,000 acres.

¹⁷ Managed by U.S. Forest Service. Includes acreage of commercial saw timber only.

¹⁸ State not interested in State forests or forestry.

TABLE 10.—*State-owned forest land compared with commercial forest land in all ownerships 1932*

Region and State	Area of commer- cial forest land in all owner- ships	State-owned ¹			Ratio to commer- cial forest area of:	
		Under ad- ministra- tion as State for- ests and State parks	Other	Total	Area under adminis- tration as State forests and parks	Total forest area owned by State
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Percent</i>	<i>Percent</i>
United States total.....	494, 898, 000	7, 078, 058	6, 140, 106	13, 218, 164	³ 1. 42	³ 2. 66
New England:						
Connecticut.....	1, 582, 000	70, 960	2, 428	73, 388	4. 49	4. 64
Maine.....	14, 490, 000	5, 760	² 400, 187	405, 947	. 04	2. 80
Massachusetts.....	3, 255, 000	120, 000	12, 500	132, 500	3. 69	4. 07
New Hampshire.....	4, 435, 000	32, 754	1, 533	34, 287	. 74	. 77
Rhode Island.....	279, 000	3, 768	500	4, 268	1. 35	1. 53
Vermont.....	3, 232, 000	42, 308	200	42, 508	1. 31	1. 32
Total.....	27, 273, 000	275, 550	417, 348	692, 898	1. 01	2. 54
Middle Atlantic:						
Delaware.....	320, 000	51	91	142	. 02	. 04
Maryland.....	2, 168, 000	50, 310	5, 246	55, 556	2. 32	2. 56
New Jersey.....	1, 973, 000	61, 449	4, 291	65, 740	3. 11	3. 33
New York.....	9, 593, 000	2, 448, 254	43, 288	2, 491, 542	25. 52	25. 97
Pennsylvania.....	13, 085, 000	1, 579, 809	291, 240	1, 871, 049	12. 07	14. 30
Total.....	27, 139, 000	4, 139, 873	344, 156	4, 484, 029	15. 25	16. 52

¹ Exclusive of an estimated area of about 11,700,000 acres of tax-reverted land, mostly in the South region the status of which is very unstable and uncertain, except for 1,250,000 acres in Michigan which is definitely in State hands.

² Of this total, 400,000 acres are lands in unorganized towns held in trust by the State for school purposes, until such time as the towns may become organized.

³ Forest Service estimates on the area of forest land in the United States do not include Kansas and Nebraska. These percentages are based on an estimated area of a million acres of forest land in each of these States.

TABLE 10.—State-owned forest land compared with commercial forest land in all ownerships 1932—Continued

Region and State	Area of commercial forest land in all ownerships	State-owned			Ratio to commercial forest area of:	
		Under administration as State forests and State parks	Other	Total	Area under administration as State forests and parks	Total forest area owned by State
South:	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Percent</i>	<i>Percent</i>
Alabama.....	21,680,000	9,326	270,000	279,326	.04	1.29
Arkansas.....	22,000,000	1,048	-----	1,048	.005	.005
Florida.....	23,600,000	4,000	-----	4,000	.02	.02
Georgia.....	22,872,000	344	5,940	6,284	.002	.03
Louisiana.....	17,922,000	6,206	26,000	32,206	.03	.18
Mississippi.....	18,293,000	23,000	300,000	323,000	.13	1.77
North Carolina.....	20,216,000	1,464	70,460	71,924	.007	.36
Oklahoma.....	4,279,000	-----	21,000	21,000	.0	.49
South Carolina.....	12,415,000	-----	3,500	3,500	.0	.03
Texas.....	12,624,000	10,565	50,000	60,565	.08	.48
Virginia.....	14,857,000	588	-----	588	.004	.004
Total.....	190,758,000	56,541	746,900	803,441	.03	.42
Central:						
Illinois.....	3,196,000	6,105	7,160	13,265	.19	.42
Indiana.....	3,438,000	34,035	21,979	56,014	.99	1.63
Iowa.....	2,358,000	7,031	-----	7,031	.30	.30
Kansas.....	(2)	1,318	-----	1,318	³ .13	³ .13
Kentucky.....	10,296,000	8,075	16,700	24,775	.08	.24
Missouri.....	16,500,000	41,133	40,000	81,133	.25	.49
Nebraska.....	(3)	2,661	-----	2,661	³ .26	³ .27
Ohio.....	4,651,000	57,479	10,400	67,879	1.24	1.46
Tennessee.....	14,041,000	39	-----	39	.0003	.0003
West Virginia.....	9,769,000	15,620	-----	15,620	.16	.16
Total.....	64,249,000	173,496	96,239	269,735	³ .26	³ .41
Lake:						
Michigan.....	19,000,000	809,050	62,000	871,050	4.26	4.58
Minnesota.....	20,200,000	1,069,095	1,230,000	2,299,095	5.29	11.38
North Dakota.....	495,000	-----	-----	-----	-----	-----
Wisconsin.....	16,200,000	122,652	257,000	379,652	.76	2.34
Total.....	55,895,000	2,000,797	1,549,000	3,549,797	3.58	6.35
North Rocky Mountain:						
Idaho.....	17,464,000	5,505	958,000	963,505	.03	5.52
Montana.....	14,865,000	203,000	236,000	439,000	1.37	2.95
Total.....	32,329,000	208,505	1,194,000	1,402,505	.64	4.34
South Rocky Mountain:						
Arizona.....	3,651,000	-----	32,000	32,000	-----	.88
Colorado.....	12,516,000	-----	156,000	156,000	-----	1.25
Nevada.....	377,000	-----	2,000	2,000	-----	.53
New Mexico.....	3,806,000	-----	121,000	121,000	-----	3.18
South Dakota.....	1,284,000	61,000	11,000	72,000	4.75	5.61
Utah.....	3,348,000	-----	55,000	55,000	-----	1.64
Wyoming.....	5,588,000	-----	120,000	120,000	-----	2.15
Total.....	30,570,000	61,000	497,000	558,000	.20	1.83
Pacific coast:						
California.....	17,538,000	46,426	14,463	60,889	.26	.35
Oregon.....	28,838,000	70,113	33,000	103,113	.24	.36
Washington.....	20,309,000	45,757	1,248,000	1,293,757	.23	6.37
Total.....	66,685,000	162,296	1,295,463	1,457,759	.24	2.19

² Of this total, 400,000 acres are lands in unorganized towns held in trust by the State for school purposes, until such time as the towns may become organized.
³ Forest Service estimates on the area of forest land in the United States do not include Kansas and Nebraska. These percentages are based on an estimated area of a million acres of forest land in each of these States.

Table 8 shows that the State forest lands which have been set aside for forest and park purposes and placed under some degree of organized administration for these purposes aggregate 7,078,058 acres, out of a total of 13,218,164 acres of forest lands owned by the States. The latter total is equal to 2.66 percent of the entire commercial forest area of the States. It must be said, however, that the amount of land actually in State ownership is in many cases undetermined, and in some States highly conjectural. State lands comprise in the main granted lands, tax-reverted lands, and lands acquired through gift, exchange, or purchase. Granted lands are seldom specifically located by the law upon its enactment. The States must usually obtain them through selection to satisfy quantity or indemnity grants, or through identification when the public lands survey reaches them (as in the case of school lands), or through establishment of their character, as in the case of swamp lands. States which still hold title or unsatisfied claims to substantial amounts of granted public lands are very likely not to know just how much forest land they have or will have. Still more is this true for tax-reverted lands. The law and procedure relating to redemption and resale of delinquent tax lands, to the forfeiture of title, and to the taking over of title by the State or county vary greatly. Except in the relatively few States which have definitely embarked upon a policy designed to discover, segregate, and place under permanent public administration in suitable units tax-reverting lands chiefly valuable for forest purposes, both the extent and the status of these lands are frequently indeterminate. They form a twilight zone between State or county ownership and private ownership, of very large aggregate proportions. With the pronounced present trend toward further abandonment of cut-over lands by private owners, this zone is broadening.

The subject of the breakdown of private ownership is dealt with in a separate section of this report. No attempt is there made to indicate the acreage of tax-forfeited land in all the States, nor to estimate its total amount. The whole field is one of uncertainties. In only a relatively few of the States in which tax forfeiture is extensive is precise knowledge of the situation available. In 29 States title reverts to the counties or towns, with no central source of information on tax delinquency. Not all of the remaining States know accurately the acreage of lands which have reached the stage of title forfeiture, and the provisions and administration of the State laws relating to forfeiture are often so lenient that a clear title is not obtained by the State for a long period, if at all.

In fact, recognition of the necessity for any other course than a temporary taking over of title as a means of passing the land back into private ownership has in most States not begun. The whole procedure is nearly everywhere based on the assumption that either through redemption by the former owner or through sale to a new owner the land can be got back on the tax rolls, and that of course it should be got back as the only way to provide for its productive use. The result of all this is that land abandonment through nonpayment of taxes has built up and is in process of further building up an aggregate of many millions of acres of "no man's land." The former owner has quit, and all efforts to keep the land in permanent private ownership will probably be unavailing, yet the State either has not taken over the title or, if it has, has done so only as a supposed means of

putting a new owner in secure possession. To afford some indication of the dimensions of the forest-land problem with which State policies must deal, one way or another, estimates were sought of the amounts of forest land in the several States which have been tax delinquent for the period fixed by law as involving the loss of title. The estimates showed a total of 11,700,000 acres.

Obviously, these figures can be considered as at most only very broadly indicative of the actual conditions. Much of the acreage may be taken back by the former owners, or at least temporarily got rid of through tax sales to new owners. On the other hand, wherever tax delinquency is widespread a strong presumption is created that a substantial increase in the amount of involuntary public ownership is impending. As an index of the general situation, the figures cited are probably overconservative; but as an indication of the particular situation at the present time in each individual State they would be, if distributed, very uneven and in some cases of very dubious value. Consequently, in tabulating the areas of State-owned forest land, tax-reverted lands which have not been incorporated in definite units of administration as State forests or State parks are uniformly not included. The fact remains that the States do actually own a very much greater amount of forest land than is shown. In the case of Michigan, where accurate data are a matter of record, a footnote indicates that the State holds title to 1,250,000 acres of tax-reverted lands in addition to the 871,050 acres shown in the body of the table as the State's total ownership.

STATE GAME REFUGES AND PUBLIC HUNTING GROUNDS

The tables do not show to what extent State-owned forest lands are under administration for other purposes than State forests and State parks. Some millions of acres are included in reservations for game refuges and public hunting grounds, but these largely embrace lands also under reservation as State forests and State parks. Further, the lands are by no means always forest lands. On the other hand, this form of land use so overlaps and dovetails with forest and park administration that it needs to be brought into the picture.

One of the purposes served by State forests is wild-life conservation and the provision of public hunting grounds. Wild life is in part a forest product. To prevent the extermination of valuable wild life and maintain a good supply of game, fish, and fur-bearers, reliance was at first placed on restrictive laws creating closed seasons, imposing bag limits, and the like. Gradually it came to be seen that more was needed than the enactment and enforcement of inflexible laws. Out of this came the conception of wild-life management.

Wild life is a renewable resource, like forests. It is a usable resource, in three principal ways. It may be enjoyed, without disturbance, as one of the attractions of the open; it may be utilized through hunting and fishing, as a means for recreational sport; and it may furnish food and fur. Its main importance as a source of food supply was in the early days of settlement and for the still earlier period of pioneer exploration, when the oncoming white men had to live off the country; in those days abundance of game sometimes determined where the settlers preferred to locate, more than the character of the soil. Under present conditions the food value of game is incidental. Its

quantity is subject to great fluctuation unless there is careful and skillful control of the various factors on which depend the abundance of any particular species of wild life within a particular area. Wild-life administration is the exercise of this control.

Sufficient food, suitable cover, freedom from molestation or disturbance, especially in the breeding season, and a check on losses beyond the number that will be replaced by the natural increase are the principal requirements for maintaining valuable wild life in reasonable abundance. Good game management calls for seeing to it that any given area is neither understocked nor overstocked. If understocked, full use of the potentialities of the area is not made. If overstocked, the wild-life population suffers in the same ways as does an overcrowded human population. Starvation and disease may then make terrible inroads upon the number, cutting it back to a point far below the normal for the area. To permit the conditions which produce overstocking is inhumane. Wise game administration aims at maintaining the right balance; and this necessitates some means of disposing of the surplus production as the optimum conditions are reached.

State forests have proved of great value as a means of keeping up the supply of game, fish, and fur-bearing animals. The maintenance of the native wild-life resource has been in some States one of the important objectives of the State forest policy. In furtherance of this purpose, many States have made portions of their forests game refuges, and some forest lands have been and are being acquired primarily or solely as game refuges or public hunting grounds. Several States use for this purpose receipts from game and fish licenses.

In short, State administration of forest lands includes the administration of an undetermined but by no means negligible acreage as an adjunct to game management. The desire of sportsmen for public hunting grounds and game refuges will probably lead to more extensive acquisitions by the States of lands with these ends in view. Where the lands are suited to use for other forest purposes consistently with the primary object of increasing the game supply or the area open to the public for hunting, presumably their dual use will be provided for. In any event, forest lands acquired or set aside for game production deserve to be rated along with State forests and State parks, as lands held under the same broad policy of permanent State ownership and administration for the service of public needs.

THE DISTINCTION BETWEEN STATE FORESTS AND STATE PARKS

Federal policy and administrative organization establish a clear line of demarcation between national forests and national parks. The establishment of this distinction, however, has been a gradual process. Many people still do not recognize it. The essence of the Federal distinction is that national-forest administration aims at a coordinated use of the various resources, material and immaterial, which each area affords. The public values involved are appraised and weighed one against another, to the end that through carefully planned adjustments of one form of use to other forms the greatest net total of public benefits may be realized. In application, this principle may mean that limited areas are devoted to a single exclusive use, because that use is the most important and in the particular

case involved cannot be dovetailed in with other forest uses satisfactorily. National parks, however, are extensive areas where the immaterial values are of such exceptional quality and supreme importance that utilization of the land for the production of commodities, such as lumber or livestock products, should not be considered.

Some States make a similar distinction between "parks" and "forests." In other States the terminology is misleading. Where the distinction is sharply drawn, the administration of the State parks and State forests may be by the same organization, or by separate units in the same department, or by entirely disassociated units. Popular thought in the East tends to run to the conception of all public forests as maintained primarily for park purposes, and this adds to the confusion. Further, the objectives of the States for the areas designed to serve the purpose of timber production generally emphasize strongly what may be called the park conception and frequently tend to relegate to a secondary place, for the time being at least, provision for making use of and increasing the valuable timber growth. Thus there are elements of artificiality in the division set up between State parks and State forests. Functionally they often tend to merge. Nevertheless, it is believed preferable in the present discussion to distinguish them.

STATE FOREST LAND ADMINISTRATION IN THE NORTHWEST

Another line of demarcation which involves some uncertainty is that between State forests and other lands in State ownership. A twilight zone has been created by State action of different kinds, that has given some State-owned forest lands an in-between status. A striking example of this is in three States of the Northwest.

By legislative enactment Montana has placed 200,000 acres of specifically designated land in definite administrative units not subject to alienation, but to be held permanently by the State and administered for purposes of timber production and watershed protection. In addition, the law prescribes that all lands of the State "principally valuable for the timber that is on them, or for the growing of timber, or for watershed protection" are not to be disposed of; and any timber cut from them must be taken in accordance with prescriptions to assure continued timber production and water conservation. The State system of fire protection covers all these lands. The major difference, and indeed practically the only difference, between the lands included in the specifically designated State forests and those not so included is that the latter are more scattered and may require considerable blocking up to assemble areas of sufficient solidity for reasonably economical permanent administration. In blocking up, a good many isolated and scattered areas may eventually prove to be unsuitably located for permanent State management. Yet it may be claimed, and with reason, that the character of the oversight exercised by the State and the law prohibiting disposal of the lands give them better title to the name of State forests than some areas so classed elsewhere. The area of these "twilight zone" lands in Montana totals 236,000 acres.

Idaho has approximately 964,000 acres of State forest land, of which somewhat more than one-half is customarily classified as in State forests. These latter lands are well blocked up, having been

obtained by the State through an exchange of its school land sections scattered in the national forests for a solid body of timberland formerly a part of the national-forest area. The State is not selling these lands, and when it sells timber from them it does so under stipulations designed to assure future timber crops. The weakness is that the whole system of administration has no other support than the choice of the State land administrative agency. The officers constituting the land board could upset the policy at any time, should they think it in the best interest of the State to do so. For this reason Idaho is counted in the present report as having no State forests. Yet, if a guess may be hazarded, these lands, already under forestry administration, will presumably continue to be so administered and will sooner or later be given the status of State forests established by law.

In Washington there are nearly 1,300,000 acres of State-owned forest land, of which more than 1,000,000 acres is reserved and usually classed as included in State forests. But this classification is decidedly open to challenge. The State has a law somewhat like that of Montana, up to a certain point. While it makes no mention of watershed values and sets up no specifically designated areas, it provides that lands acquired or designated by the State forest board as State forest lands shall be forever reserved from sale. When timber is cut from them, it must be in conformity with the requirements of that board to insure natural reforestation. The State has about 403,000 acres of forest land in solid blocks obtained partly through an exchange similar to that in Idaho, partly through the exercise of rights of selection. In addition, various officials are required to report yearly to the State forest board any State or private logged-off or deforested lands coming to their notice, which they regard as suitable for State forest lands or reforestation; and the Commissioner of Public Lands may classify and reserve logged-off State lands suitable for reforestation, whereupon it becomes the duty of the Director of Conservation and Development to protect and reforest them. Although, as said above, the State now has under reservation more than 1,000,000 acres, up to the present time the State forest board has designated as State forests only 45,757 acres. Yet with its more than 400,000 acres of blocked-up lands obtained through Federal exchange, with its still greater area of other forest lands that have been reserved for reforestation, and with a definite State policy so clearly formulated legislatively, Washington has gone much farther than would appear from the bare statement of the acreage embraced in definite units of administration. Nowhere else are the drawbacks of a sharp division between "State forests" and "other State-owned forest lands" so well illustrated. Whatever the scheme of classification, if it does not bring into view the extensive twilight zone of lands not actually under administration as State forests but more or less definitely held with a view to their future use for this purpose, its results carry misleading implications.

In these three Northwestern States, each owning large acreages of forest lands which occupy a kind of halfway status between organized, permanent State forests and State lands awaiting a purchaser, the forest holdings are made up principally of lands which have never been in private ownership, but came into the possession of the States

through Federal grants. The "twilight zone" condition is, however, not confined to States which became forest owners through grants from the old public domain. It is found in some of the Eastern States which have become possessed of forest lands under the process which is creating the "new public domain," made up of abandoned private holdings. Michigan, Wisconsin, and Minnesota are outstanding examples.

STATE FOREST LAND ADMINISTRATION IN THE LAKE STATES

Except for the prairie portion of northwestern Minnesota, in all three of these States a large fraction of the northern portions cannot be successfully used for agriculture. Because of the magnificent stands of virgin timber, the land became a rich prize for the lumbermen, and for several decades the Lake States led the country in lumber production. It was generally assumed that the cut-over areas would soon be converted into prosperous farms; but the hope of a flourishing general agricultural development in succession to the great pineries proved delusive. Great portions of the stump lands, in spite of vigorous efforts to dispose of them to settlers, either remained unsold or were cleared only to be abandoned after years of wasted effort, save where the soil proved to be of exceptional quality or where the occupant, for lack of courage or initiative to try again elsewhere, clung to his submarginal acres and eked out a scanty livelihood as best he might. Now, belatedly, it is realized that the best hope of prosperity for the country of the "Great North Woods" is to restore the nonagricultural and submarginal agricultural lands to forest production, and that this will necessitate extensive public ownership and reforestation, at a heavy expense for years.

Some of the sparsely settled northern counties are bankrupt, and many are a burden on their State, drawing much more from the treasury in the form of contributions toward the cost of local government than they return. At the same time the tax rate on such property as remains to be taxed in the poorer counties is as a rule very high, and tending to go higher. Tax delinquency has reached such proportions that the problem of the "new public domain" cannot possibly be ignored. Its magnitude is illustrated by the fact that from 18 million to 20 million acres of forest land in the Lake States is tax delinquent and at least in major part virtually abandoned by its owners, with a rate of increase in the amount which bids fair in another decade, if it continues undiminished, to place in public ownership well on toward one half of the forest area of the region.

Already Michigan has, in addition to several hundred thousand acres which have been included in her present State forests, 1,250,000 acres of tax-forfeited lands, with perhaps 4 million acres more that is at some stage of tax-delinquency. In Wisconsin tax-forfeited lands pass not to the State but to the county; the amount is uncertain, but according to some estimates seems to approach 1,900,000 acres with more than 3 million acres addition estimated to be tax delinquent. In Minnesota before the close of 1933 the tax-forfeited lands will total 4 million acres. The reverting lands, naturally, have been stripped of their salable timber and in large part are idle, fire-devastated waste. State policies designed to work out the permanent retention of large aggregates of these lands for permanent

public forests have set up the Lake States twilight zone of lands which are being more or less definitely held with a view to this form of use, but which are not as yet under actual administration nor as yet sufficiently blocked up, oftentimes, to provide practicable units of administration.

The first of the three States to adopt a policy looking to the reservation and administration for forest purposes of tax-reverted lands was Michigan, with a law enacted in 1909. Some years previously more than a million acres of tax-forfeited lands had been in the hands of the State but had largely gone back, at least temporarily, into private ownership through their purchase by speculators, who had sold them off as farmlands to unwary victims. A public domain commission was therefore created to segregate the lands really suited to agriculture and set aside the rest for forestry purposes. The reservation of not less than 200,000 acres was made mandatory by the law. But locally, public sentiment was adverse to heavy withdrawals from private acquisition, preferring that the land should be open to homesteading in the hope of more settlers; and the commission limited itself to reserving a total of 235,194 acres in small bodies scattered through 54 counties. Gradually, however, the principle of classification has come to be generally accepted in Michigan. A law passed in 1929 requires that all tax-reverted lands shall be turned over to the conservation commission, with a view to their consolidation into State forests or other public reservations unless they are found suitable for homesteading.

At the present time the State has 12 established State forest units, with a gross area of approximately 1,400,000 acres. Within these units the State owns or has in process of acquisition 863,113 acres, and its ownership has been increased through exchanges, purchases, and donations as well as through tax reversion. But the prospective burden which will be imposed upon the State if it carries through the policy of reforesting, protecting, and otherwise caring for the great areas of virtually worthless lands that are in sight is so great that it is a good deal of a question how far to pursue the course marked out. Tax reversion has been adding new lands to the State's holdings at the rate of a quarter of a million acres a year, and this rate will probably be greatly accelerated in the immediate future through the effects of the business depression. In 1931, the last full year for which figures are at hand, 32,040 acres of land within the State forests were reforested through planting, while the nonrestocking land in these forests is estimated to aggregate 220,000 acres and the poorly restocking an additional 204,000 acres. The depression has halted expenditures for further planting and land purchases. There is doubt in some quarters as to whether the results of reforestation will justify the cost, at least on the lands of poorest quality; there has been considerable hesitancy about turning over to the conservation commission, as the law requires, lands which might be got back on the tax rolls through resale; and the commission itself has been hesitant to carry through the policy of placing under forestry administration to the fullest extent the lands over which it has jurisdiction, lest the appropriations necessary for the administration of more State forests may not be forthcoming. The acreage of tax-reverted lands which the commission is now holding, with its disposition not as yet definitely determined, is much greater than the acreage of State-owned land within the established forests.

Some of the tax-reverted lands have been reserved and placed under administration as State parks and State game refuges; but the aggregate required for these purposes does not materially alter the situation. In the 1929-30 biennial report of the Michigan Department of Conservation, the State forester, after pointing out that the total area in forests, parks, and game refuges comprised only 39 percent of the entire amount of land held by the State, went on to say:

Compared to the millions of acres of similar lands within our borders on which the crop must be timber or nothing, it is but an insignificant part. Obviously it is so nearly a negligible quantity with respect to the whole that unless enormously expanded it can have no appreciable effect toward the solution of the situation in general. This condition is neither local nor confined to present State lands, but involves a vastly greater acreage, more or less State-wide. It is variously estimated that there are between 10 million and 20 million acres of just such land as has reverted to the State that are ill-adapted for anything but tree growth. A conservative figure would be 15 million acres. Whatever the area, it is of such magnitude that it constitutes the most important task in conservation confronting Michigan today. It is a big problem which must be met in a big way sooner or later, and the sooner the better. Michigan must think of State forests in terms of millions of acres instead of thousands.

This enormous twilight zone of artificially created near-desert, which will not stay in private ownership, which the people of the State have through their legislature authorized their administrative officers to take charge of and place in State forests and similar reservations, but which can be restored to productiveness only through very considerable expenditures that must extend over many years before substantial money returns can be looked for, creates the outstanding problem of forestry and land utilization in the Lake States. Only to a minor degree does the Federal policy of acquisition for the building up of national forest lighten the prospective burden on the States. In view of the complexity as well as the magnitude of the unsolved problem of what the States should, can, and will do with their new public domain as it enlarges, definite assumptions regarding the extent to which the lands now tax-reverted are on the way to being placed under administration would be premature.

In Wisconsin the problem presented by tax-reverting lands is given a somewhat different form by the fact that title passes to the counties. In consequence the State has adopted a policy of financial aid to encourage county forests. Wisconsin's county forest system is discussed in the section of this report entitled "Community Forests." The point to be noted here is that the development of county forests is in Wisconsin a part of the program adopted by the State for placing in public forests lands abandoned by private owners as not worth paying taxes on. Wisconsin has in State forests 111,100 acres, with 320,000 acres more in process of acquisition, and in county forests 460,521 acres. The two must be considered together if the effort that the State is making to meet its forest land situation is to be fairly judged.

Of the area in county forests 292,981 acres, or 64 percent, is not under actual management. In addition, the counties are said to own 1,440,000 acres of forest land which has not been placed in county forests. The law authorizing them is still new. Since for every acre included in a county forest the county draws from the State treasury 10 cents annually and the township 10 cents more, a strong incentive to give the lands the designation is set up. But

unless they are to be handled in accordance with the practices of technical forestry, designating them county forests does not convert them into productive land. If the present legislation and present trends in tax delinquency are continued for 10 years, the county holdings are likely to be increased by possibly 6 million acres. Here again, the economic burden which must be assumed by some agency if all the lands are to be put into an actually productive condition promises to be staggering. It remains to be seen just what plan of administration will eventually be worked out in Wisconsin, and how extensive will be its application; but it is possible to attach more significance to the figures of area of the present combined State and county forests than they perhaps deserve. That Wisconsin is now very much alive to the formidable dimensions and serious character of the land use and forest problem which has to be faced is quite true, and that a great change in the situation will be worked out seems unquestionable; but compared with the State forest systems of the few States in which the enterprise has become firmly established in public approval and put on a good working basis, the present showing of Wisconsin in provision for public forest administration is mostly a showing on paper.

Minnesota also has awakened to the necessity of meeting in a large way the land use problem created by temporary private ownership of forest lands for the sake of the accumulated timber values, with its aftermath of land surrender when the merchantable stand has been cut off. The situation in Minnesota is made different from that in either Michigan or Wisconsin by the fact that Minnesota still holds a large aggregate of timberlands received under the Federal land grants. While Michigan has only about 12,000 acres of forest lands left of the original granted lands, and Wisconsin about 190,000 acres, Minnesota has more than 2 million acres. In addition, under the provisions of a law enacted in 1927 to afford a clear title to lands on which taxes have not been paid for 5 years, some 4 million acres are expected from this source in 1933. Thus there is a combination in Minnesota of the situation that exists in the other Lake States with respect to reverting cut-over lands and of that which exists in Montana, Idaho, and Washington with respect to forest lands derived from Federal grants. Like the three Western States, Minnesota has constitutional restrictions upon the sale of the granted lands which have operated to hold in her possession a very substantial part of her originally more than 8 million acres of granted lands of all kinds.

Although Minnesota passed the first law looking to the establishment of forest reservations in 1899 and shortly afterward received, through a private donation and a special Federal grant, a few thousand acres dedicated to this purpose, and although following a constitutional amendment in 1914 400,000 acres were given the status of State forests, the actual organization of a system of State forests as going enterprises is still in the formative stage. Prior to 1931, 13 units with a gross area of more than 1 million acres but embracing a little less than 500,000 acres of State-owned lands received designation as State forests. No development work has been undertaken on these units, and no local organization created primarily to take charge of and care for them has been set up. Instead, the State's holdings within them are administered and protected, as an incident to other duties, by the district fire wardens and rangers of the organization

provided for fire control on forest lands in all ownerships. This course is necessitated by the fact that no specific financial provision for the administration of State forests has yet been made. In 1931 the legislature designated as State forests certain other areas, embracing an additional half million acres of State land, but these are as yet only paper forests.

From tax-reverting cut-over lands the Conservation Department's program aims at blocking up an approximate total of 4 million acres of State forests in the next 10 years. Comprehensive legislation has been enacted looking to a determination of the form of use to which are best adapted all the lands now in or which may come into State ownership, with provision for placing in reservations for various purposes those lands calling for permanent public ownership and administration in order to give them their highest usefulness; and there is provision also for acquisition of private lands which should be consolidated with the State's holdings. In line with this legislation, a land classification survey is covering the areas within and adjoining the State forest boundaries, and has already gone over nearly 2 million acres to obtain a factual basis on which to rest acquisition and management programs. Thus the forest and land use problem is being aggressively and constructively attacked. On the other hand, the situation presents some uncertainties.

A possible difficulty in carrying out the constructive policy upon which the State has made so promising a start arises from the fact that neither with respect to the lands received through Federal grant nor with respect to those received through tax forfeiture is the State free from restricting obligations. The granted lands are lands held by the State in trust, for specific purposes. The tax-reverted lands likewise carry an obligation of trusteeship for the various taxing units in the proportion of the unpaid taxes, with the State's equity in them usually less than 10 percent of the whole. There is a considerable inclination among the local county and township officials to feel that under these circumstances the county rather than the State should have the determining voice regarding what disposition shall be made of the land. It remains to be seen what kind of division of responsibilities and what plan for satisfying claims and obligations will be worked out. Most of all, it remains to be seen what the public sentiment of the State will permanently sustain and demand and how successful the State will be in obtaining the continuity and stability of policy and the competent conduct of the enterprise necessary for its success.

That a high standard of competence as well as integrity are fundamental to making the essentially business enterprise of forest management anywhere a success, and that no business, public or private, can be expected to succeed if it cannot be run solely with a view to the most efficient conduct of the enterprise, are matters that have already been repeatedly brought out. Nepotism in a private concern endangers the invested capital; and public administration equally requires freedom from the dry rot of political motive or control for narrowly political ends. It is all a question of developing high standards of efficiency in the field of State government and providing the necessary stability when the enterprise is in competent hands.

Hitherto, State governments taken as a whole have not been conspicuous for their success in developing the function of public service as applied to difficult, constructive tasks. The situation of the Lake States in this respect is on all fours with that of every other State in which public forest administration may be undertaken as a State enterprise. It is the same situation as that which for a good while made the success of the Federal forest reserve policy uncertain. Success in that came through a happy combination of very unusual circumstances, of which one was the establishment on a firm foundation in the Federal establishment of the merit system for the Civil Service.

REGIONAL CONCENTRATION OF STATE FORESTS

Of the 7,078,058 acres embraced in organized State forests and parks 89 percent is in the North and Middle Atlantic States and the Lake States. New England has 276,000 acres of forest in her State forests and parks, New York has about 2,450,000 acres, Pennsylvania about 1,600,000 acres, New Jersey 61,000 acres, Maryland, 50,000, and the three Lake States 2 million acres not including Wisconsin's 460,000 acres of county forests, with large further increases in prospect under legislation already enacted. In the far Northwest, Montana, Idaho, and Washington make up another group of States in which there are extensive holdings of forest lands under more or less definite reservation (or in Idaho's case under actual operation though without any expressed legislative policy of management or permanent ownership) for State forest purposes. These three States together own 2,700,000 acres of forest land, of which not quite three fourths take their place in the "twilight zone" between State forests and "other State-owned forest land." Elsewhere than in these three groups of States, one along the Atlantic coast, one about the Great Lakes, and one in the Pacific Northwest, State forests have scarcely begun to appear on the map. Within these three groups of States is the ownership of 86 percent of all the State-owned forest land in the country.

This high degree of concentration of State forests suggests at once some important questions. Why have not States in other regions embarked on programs of extensive forest ownership and administration? Are they likely to fall into line shortly, or must any large increase in the area of public forests, if a large increase is necessary, depend upon Federal action either through a greatly expanded program of acquisition for national forests or through aid to the States, to enable or induce them to acquire the lands themselves?

In attempting to get at the facts which may throw light on these questions it is essential to bear in mind the very different situations in the western half and in the eastern half of the country. One great difference is that of the entire western commercial forest area 62 percent is federally owned, or is managed by the Federal Government as trustee on behalf of Indians, and 53 percent is in national forests, as against 2 percent in Federal ownership or trusteeship and 1.7 percent in national forests in the East. Many of the public needs in response to which eastern State forests are being built up, to the extent that

they are being built up, are in large measure taken care of in the western country by the national-forest system. It is true that in the West land use problems of large proportions are beginning to appear in several States, as the timberlands in private ownership are converted into cut-over lands which the owners may no longer wish to retain. Even in meeting this problem, however, the Western States are appreciably aided by the possibility in many instances of adding these cut-over lands to the national forests.

What has been done by the Western States hitherto toward building up State forests has been due primarily not to a felt need for State ownership leading to a policy of acquisition, but to the Federal land grants. In most States the policy, practically from the time that the State governments were set up, has been to dispose of the granted lands as fast as there was a sufficient demand for them to permit them to be sold off. In a majority of cases the States have disposed of most of their granted forest lands. It should be remembered that the grants of public domain lands were made for specific purposes and that the States, in receiving them, were in the position of trustees. School and institutional grants, for example, were in the nature of endowments. As administrators of trusts the States were bound to consider first of all the best interests of the beneficiaries of the trust. The State educational institutions and public school systems were the leading beneficiaries, and by the sale of the lands and investment of the proceeds dependable sources of revenue for these institutions were created. To hold the lands and put them under administration for the sake of general public benefits which might thus be realized, or to engage in enterprises of forest management of uncertain financial outcome, would not have been in accord with the obligations of trusteeship for specific beneficiaries.

Several of the States, however, introduced into their constitutions safeguards against the disposal of granted lands by the State land authorities at too low prices. The effect of these restrictions has been to keep relatively large areas in the hands of the States having the limitations, for lack of purchasers willing to pay the necessary price. Idaho and Washington are examples. North Dakota, New Mexico, and Arizona are similarly restricted under the terms of their respective enabling acts.

Where States had rights under their land grants to school sections scattered through the national forests, or right of selection based on the school sections, the Federal Government has if possible negotiated exchanges with a view to enabling the States to obtain lands of equal value outside the forests. Under the exchange agreements, the States have been given an opportunity to obtain in lieu of their school lands solid blocks of land eliminated from the forests to permit the States to file on them. In this way the following States have received lands suitable for administration by them as State forests or parks, in the amounts shown:

State:	<i>Acres</i>	State—Continued	<i>Acres</i>
California.....	8, 973	Oregon.....	68, 666
Idaho.....	282, 997	South Dakota.....	60, 150
Montana.....	106, 607	Washington.....	405, 942
Nebraska.....	8, 959		

At the present time exchanges are under negotiation with Colorado and New Mexico, by which the first State will receive approximately 100,000 acres of blocked up land and the second 286,757 acres.

The acts granting statehood to Arizona and New Mexico also granted large areas of public lands for common-school purposes, but provided that where the lands so granted were within national forests the States would not acquire title thereto unless or until the lands were eliminated from the national forests. But the acts specified that pending that time there should be paid annually to each State shares of the gross revenues from the national forests proportionate to the ratio between the lands granted to the State and the total net area of national-forest lands within the State. The States, however, were privileged to use the granted lands as base for lieu selections of unreserved public lands. New Mexico has exercised this privilege so fully that only about 35,000 acres remain in the national forests subject to the rule mentioned; but Arizona largely has preferred to leave her granted lands under national-forest management and has to her credit approximately 1,125,000 acres in that status. Some 30,000 acres of university lands are also administered by the Forest Service for Arizona under cooperative agreement. In New Mexico the State secures technical advice in timber management from the Forest Service, but the agreement does not cover the actual protection and administration of State lands by the Federal agency.

In South Dakota, the State park of 61,000 acres and an additional area included in a State game refuge were obtained through exchange, and California's 9,900-acre State forest is likewise the result of an exchange. In short, the explanation of most of the State forest land administration that has been undertaken or is in prospect in the West is to be found in the fact that because of the presence of the national forests the States were able to convert their school lands into blocked-up areas suitable for enterprises of forestry. They have had the great advantage of being able usually to start with lands on which the original timber was still in place. The few States which remained in possession of more than small remnants of their granted lands are now able to go ahead with undertakings of forest management far different from those that must begin with stripped lands, as in the East. Except in Washington there is nothing as yet to indicate that there is any thought of building up State forests as they are being built up in a few of the Eastern States, to take care of the land use problem created by the breakdown of private ownership.

Neither is it to be expected that extensive enterprises of forest administration are likely to be engaged in soon by many more Eastern States than those which have already made substantial beginnings. It is a very slow process to get such enterprises under way. New York has reached her present position after nearly 50 years of up-building; Pennsylvania after 35 years; Connecticut after 30 years; and so on. The Lake States have been moving a long time, but without much progress until they suddenly woke up to an economic and social problem of the first magnitude for them, which could not be ignored. Much depends on the accident of finding the right leadership and a favorable combination of circumstances. Much of the support for State forests in the East has come from those interested in outdoor recreational opportunities. In States of relatively

sparse population, rural conditions, and less wealth this form of interest will be much less impelling. Given strong local leadership, there may be seen a really important development of State forest administration for the region of worn-out farms, eroded hillsides, and poor soils that extends north of the Ohio, from Pittsburgh to the Mississippi; but outside of this region and the regions in which are so highly concentrated the State forests at the present time, to expect any really large local movement for the undertaking of land acquisition on an extensive scale would seem to fly in the face of all probability. The necessary motive forces do not seem to be in sight.